COAL AGE

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MR. MINE FOREMAN—You have read so many admonitions suggesting that you should have all the virtues of the Stone Figure of Justice over the county-hall clock, that you may pass this one up; however, a thought lies edgewise in my mind like a herringbone across one's gullet, and won't down.

You have arrived at an old mine, where the tonnage cost is too high, or the output too low, perhaps both—they usually hunt in couples.

What are you going to do about it? Will you laugh and say, "I'll make the old fellow dig down into his jeans and get some equipment here."

I never saw that scheme tried but it failed. And why? Because the man who thinks in that way is usually trying to get the other fellow to solve his problems for him. And when the equipment is obtained, he hasn't the men, or the mine works slow time, or somehow things are out of joint.

It's foolish to say, "Give me an appropriation and I'll give you cheap tonnage." You're promising sufficient men, a steady market, and no accidents. It's far better to go easy, and look around. Let everybody know you're boss, but don't think you have to make good the first day.

And now look for the best investment money will bring. In nearly every mine, there are opportunities (some temporary, others permanent) to employ capital so as to net 100 per cent. each week. This first investment should be one which won't show up on the semi-monthly roll, and will be totally absorbed by the quick profits. And in figuring profits, don't forget tonnage; when the mine isn't making its capacity, larger output can be cared for without extra handling cost, during the gossiping time of the men.

The shooting of a small hill in the mine—in a place where doubling is necessary; the ditching of a dip which will cut out a compressed air pump and give a "puncher" a better show; the laying of a longer pipe line through and beyond a sag so as to avoid pumping; the cleaning of a piece of dirty road, and perhaps the corduroying of it, are all chances to shave costs.

The roads you grade or clean may have been the cause of a general haulage lag. Perhaps the dip you drain was frequently flooded, and that may have washed the oil out of the axle boxes of the cars, making them run hard and thus lowering your tonnage.

Your predecessor probably met these troubles by "hollering"—a cure for low production as effective as an Indian's cure for low pulse. But you're no copper-skinned medicine man and it's better to solve your problems like a man of intelligence and practical training.

However, don't try to remedy all faults at once. Correct the glaring things first, and endeavor to select and rectify those evils which, when corrected, will return the principal in 7 to 14 days. You wouldn't loan money at 25 per cent., if you could get 50.

In the second fortnight, it's possible to tackle jobs you couldn't touch in the first two weeks, because doing them would have boosted the cost of coal. But, having made a first economy that now earns for you without further expenditure, it is expedient to make slower-paying, but no less important, investments.

One word more—don't let your cost of coal go down too low till the necessary improvements have been effected, till it is certain your mine is safe within the law, and until you are sure the low cost can be maintained.

Running a mine is a long-distance event, and the fellow who winds himself on the getaway, won't even be able to walk across the finish tape. Don't try to start by making a record, and later have to increase operating charges to keep the mine in condition. When you start breaking records in the matter of cost per-ton, be sure it is downward and not skyward.

An Illinois City Coal Mining Plant

By E. F. Mullin*

Favorably located in the heart of a large city, this mine outgrew its old equipment, and recently the owners built a new, fireproof surface plant of 3000 tons daily capacity. The design, construction and operation of this plant are described in detail.

*Columbus, Ohio.

Few of the larger cities in this country can claim, as one of their home industries, an uptodate coal-mining plant, equipped to handle a daily output of 3000 tons of prepared coal. Springfield, Illinois, however, has the distinction of having within its limits such a mining operation, the property of the Capital Coal Company, which started mining about thirty years ago and has steadily grown until now one of the leading operators in the Illinois field.

The location of the mine from a commercial standpoint is ideal, it being practically in the heart of a large and growing city, whose citizens use a large portion of the mine's output at retail prices, while three railroads, together with an interurban traction line, carry the balance to their respective markets.

The city not only offers a ready market for the coal, but also extends to employees of the company social and educational advantages seldom found in the mining towns and districts of this country and the result is, an organization of miners, who are thrifty and industrious citizens, many owning their own homes and educating their children in lines other than that of "digging coal."

Under these favorable conditions, the demand for coal from this mine gradually grew, until the company's original surface plant became inadequate for the economical handling of its output and, early in the spring of 1910, the directors decided to replace their old wooden tipple and headframe with a steel structure, equipped with the latest type of machinery for preparing Illinois coal.

General Construction

It was the company's intention at that time to continue to use its old wooden rescreen house and wagon bin; but about the time it closed the contract for the new tipple and headframe, a fire broke out, completely destroying the rescreen house and wagon bins, as well as the power plant, headframe and tipple. This brought about an immediate decision to rebuild the entire surface equipment using a form of construction as nearly fireproof as possible, and resulted in the installation of a plant consisting of steel headframe and cages, steel tipple, steel wagon bin, steel rescreen house and bin, and brick power-

Fig. 1. View Showing Rescreen House and Wagon Bin

plant buildings designed and built by the Jeffrey Manufacturing Company, of Columbus, Ohio.

A plan of the surface layout is shown in Fig. 5, as far as the limits of the drawing will permit. The office building, shops, and connections of the tipple tracks to the main tracks of the traction and railroad lines are not shown.

Three photographic views are shown,

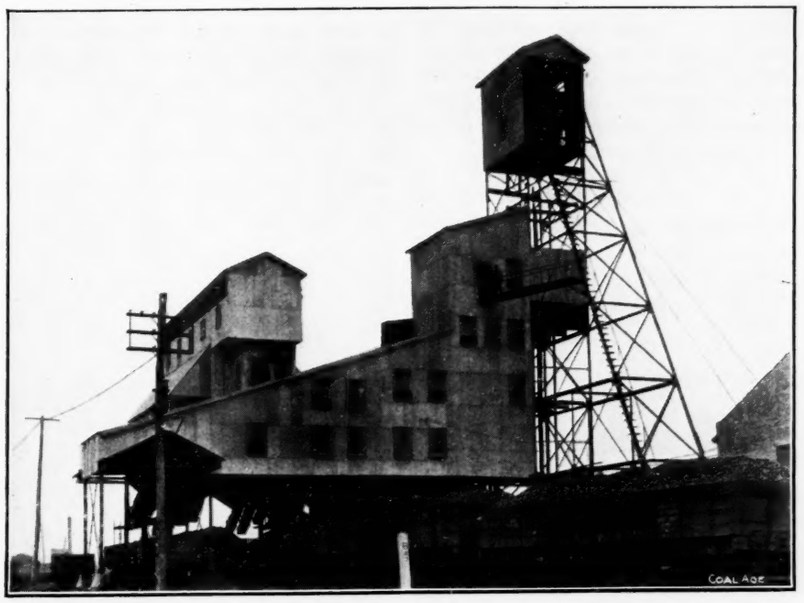


FIG. 2. VIEW SHOWING HEADFRAME AND TIPPLE

in Figs. 1, 2 and 3. The completed headframe and tipple are seen in the foreground of Fig. 2, with the rescreen house and bin in the rear. Fig. 1 shows a photographic view of the plant taken from the side opposite to that of the view shown in Fig. 2. The rescreen bin and wagon bin are in the foreground, and the headframe and tipple are seen in the rear.

The headframe, tipple and wagon bin, all under construction, are shown in Fig. 3. The construction of the rescreen house and bin had not been started at the time this view was taken.

A City Coal-mining Plant

A longitudinal view of the tipple and an end view of the wagon bin are given in Figs. 4 and 6, respectively.

This new equipment was put into operation early this year and will hoist, screen and handle 300 tons per hour. During the past winter, it was not an unusual thing to see 50 to 60 wagons waiting their turn to be loaded with coal for the local domestic trade, which, on some days, aggregated 700 to 900 tons, the arrangement of bins and loading facilities making it possible to easily handle this amount per day.

The shaft is 10x13 ft. and has two compartments for the use of balanced hoists. There are three loading tracks passing under the tipple, two of which also pass under the rescreen bin. The lump-coal track is provided with a track scale located below the tipple and opposite the rescreen bin.

Headframe and Cages

The headframe is of steel construction, supported on four columns, and towering about 90 ft. above the rail. The engine or back brace runs parallel to the loading tracks and is provided with a stairway leading from ground to the sheave room, together with a walkway from the latter to the weigh room in the tipple, as shown in Fig. 2. The headframe is equipped with two extra-heavy 72-in. bicycle-type head sheaves, grooved to take 1¼-in. hoisting rope. The sheaves are housed over with a steel frame covered with galvanized corrugated iron. Steel trolley beams are provided in order to facilitate the handling of the head sheaves and accompanying parts.

The cages are of the two-way self-dumping type, capable of handling cars weighing, rock loaded, 8000 lb. They are constructed of wood and steel and especially designed to dump two ways, in order to provide a means of handling the rock brought from the mine.

These cages are provided with double rocker and double dumping shafts so that by the interchanging of a pin, the cages will dump either right or left. The rock cars dump to the right of the headframe as seen in Fig. 2 into a small rock bin not shown in this view.

Steel Tipple

A longitudinal section of the tipple, showing arrangement of scales, chutes, screens, etc., is given in Fig. 4. The self-dumping cages automatically discharge the two-ton coal cars into a chute leading to the weigh hopper *B*. This hopper will hold something over two cars of coal and is suspended from a five-ton scale-beam frame. The scale is equipped with a quick-weighing dial, located in the beam box *A*. The weigh hopper is fitted with a swing gate, operated by toggles through levers from the scale-room floor.

The coal is discharged from the weigh hopper into a reciprocating feeder *C* which is of a special design, being arranged to feed the coal either of two ways by changing a valve located at

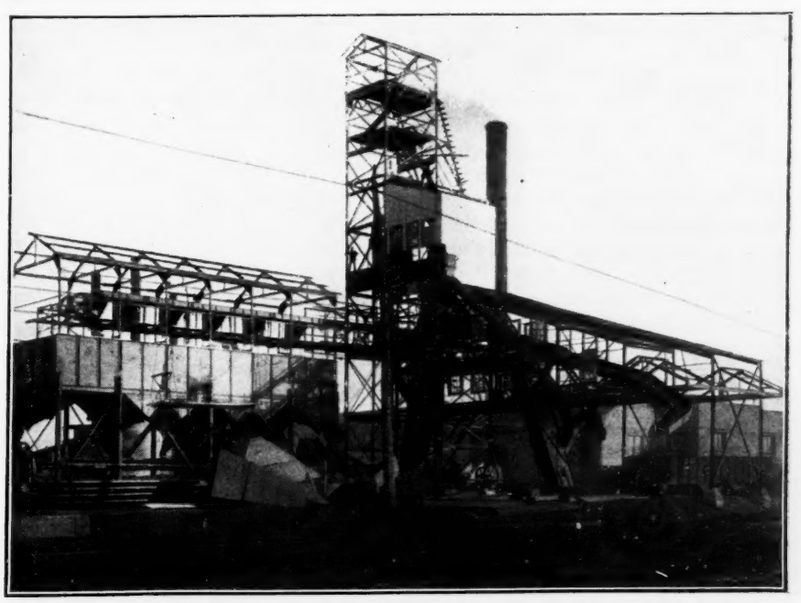


FIG. 3. VIEW OF PLANT DURING CONSTRUCTION

the center of the feeder plate. Coal may be fed regularly to conveyer *I* (described later) or to the upper shaking screen *D*.

This screen *D* measures 7 ft. by 22 ft. 6 in. and is provided with 16 lin. ft. of 1¼-in. round perforated plate, arranged in steps of 4 in. every 4 ft., in order to turn the coal while in transit and thus give better screening results. The lower deck of this screen is of plain steel plate, and the slack passing through the screen perforations is carried on this deck to a valve at the lower end whence it falls into chute *H*, delivering to the slack car or, if desired, is bypassed to elevator *M*.

Coal passing over the upper deck of screen *D* is delivered to screen *E*. This measures 7x26 ft. and is provided with two decks similar to those of screen *D*. The upper deck has 12 lin. ft. of plate with 3½x2½-in. oblong perforations, and the egg coal passing through these perforations is delivered into chute *G* leading to the car or, if desired, is bypassed to elevator *M*.

The lump coal passing over screen *E* is carried around the radial chute *F* to the cars. This chute is provided with loading fingers and suspended at its lower end from a hoist in order to vary the pitch for loading lump and run-of-mine product. Screens *D* and *E* are designed to deliver run-of-mine coal to the lump track without the use of veils for covering the screen plates, a feature which will appeal to many tipple "bosses" because of the simplicity of operation, it being necessary to merely close the valves in the lower decks of the screens when shipping run-of-mine.

The shaker screens are driven by a 25-h.p. motor through two belt reductions, their eccentric shaft running at 100 r.p.m. The eccentrics have a 6-in. stroke and are designed to eliminate as far as possible the heating, due to constant service and the tendency to get out of line.

Lump-coal Conveyer

Conveyer *I* is of the scraper type, with flights carried by two strands of chain. The run-of-mine coal from the reciprocating feeder is delivered to the upper strand of the conveyer, and at the loading point there is inserted in the conveyer trough a 14-ft. section of adjustable screen bars for taking out the fine coal. The screenings, passing through, are carried back on the lower strand of the conveyer and delivered into chute *N* leading to the elevator *J*. The lump coal carried beyond the screen on the upper strand of the conveyer is delivered to the wagon bin, as indicated in the photographic view, Fig. 3.

The elevator *J* handles the fine coal from the chute *N*, and also the screenings delivered by the screw conveyers from the wagon-bin chutes. This elevator has a lift of about 44 ft., is of the continuous-bucket type, runs at 150 ft. per minute, and is capable of handling 135 tons of coal per hour. It discharges into chute *L*, leading to the screen *D*, or by means of a valve, to chute *K* leading to elevator *M*. The reciprocating feeder *C*, conveyer *I* and elevator *J* are driven by a 40-h.p. motor through belt, chain and gear reductions, friction clutches being provided for all units.

The steel framework of the tipple is made independent of the headframe, in order to eliminate the transmission of vibrations from the shakers to the latter structure. The tipple's roof and siding are of galvanized corrugated iron.

Wagon Bin

The wagon bin shown in Fig. 5 measures 18x58 ft. in plan and has a capacity of 325 tons. This bin is kept full at all times to meet the demands of the local trade. The distributing conveyer *I* is carried along the top of the bin and is housed in by a steel framing covered with corrugated iron. The bin proper is supported on ten columns, its sides being of the girder type. The distributing conveyer has six delivery points in the bin, five of which are provided with rack-and-pinion valves operated from a walkway alongside of the conveyer.

The method of loading coal into retail wagons is shown plainly in Fig. 6. The bin is provided with four loading chutes on each side and these chutes are each fitted with flanged lip screens for removing the slack coal. The ends of the loading chutes are provided with manipulating devices for governing the flow of coal into the wagons. Slack passing

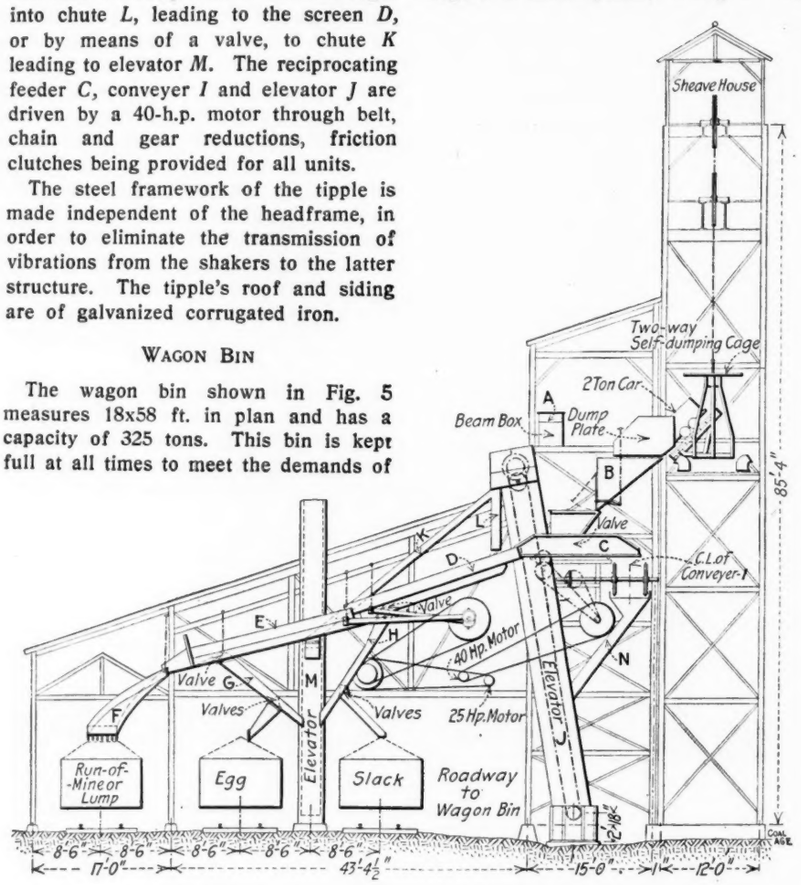


Fig. 4. Longitudinal Elevation of Tipple

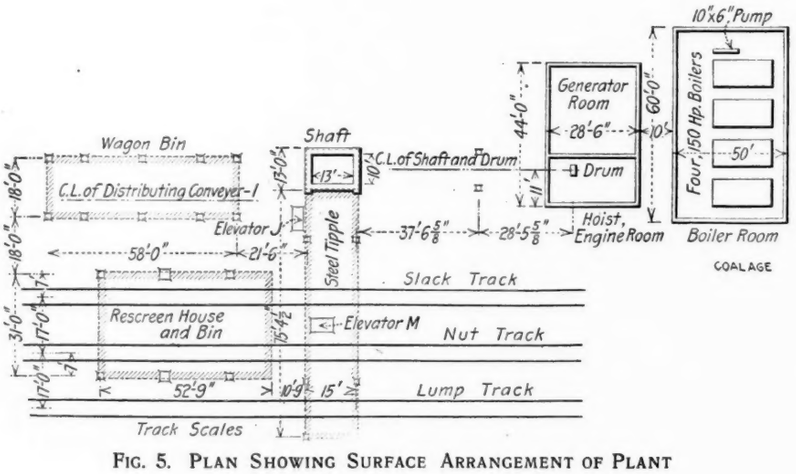


Fig. 5. Plan Showing Surface Arrangement of Plant

through the lip screens is gathered into small hoppers and discharged into a longitudinal system of screw conveyers, which deliver into elevator *J* at the tipple.

Rescreen House and Bin

A rescreen system of some kind is an essential part of a modern Illinois mining plant. The Capital Coal Company, realizing its importance, decided on a revolving-screen type of plant with a bin of sufficient size to store coal up to the capacity of at least eight railroad gondolas. The house and bin shown in Figs. 1 and 2, and also indicated in the plan, Fig. 5, is a steel structure 31 ft. wide by 40 ft. long, with a capacity of 400 tons, supported on six columns, housed over with a steel framing covered with corrugated iron, and equipped with windows and louvers.

The coal which passes through the perforations in the tipple shaker screens can be loaded into elevator *M* and ele-

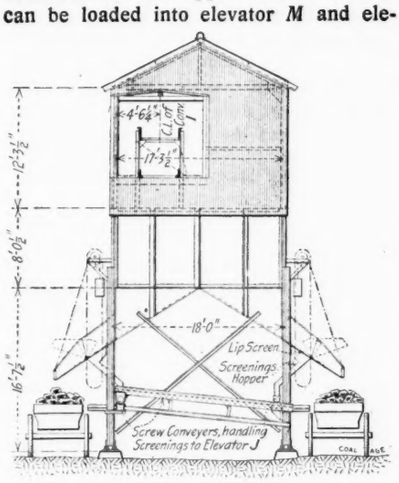


Fig. 6. End Elevation of Wagon Bin

vated to the revolving screen. Elevator *M* is of the inclined continuous-bucket type, running at 100 ft. per min. and capable of handling 135 tons per hour. The revolving screen is 6 ft. in diameter by 28 ft. long, extends longitudinally with the bin and is carried by three cast-steel friction rings running on roller shafts. The first section of the screen is covered with $\frac{7}{16}$-in. mesh wire cloth, the second section with 1¼-in. mesh and the third section with 2¼-in. mesh. This arrangement gives a grading of coal which meets the market requirements.

The bin is divided into eight compartments, giving a storage of 50 tons each. Each compartment terminates, over the center line of the loading tracks, in hinged chutes provided with chop gates for feeding to the cars. The side of the bin adjacent to the wagon bin is equipped with side-loading chutes, for serving wagons with any of the four graded sizes stored in the bin.

Elevator *M* and the revolving screen are driven by a 40-h.p. motor through belt and gear reductions. The motor is housed separately, as a safeguard against fire, just below the overhanging portion of the screen house indicated in Fig. 2. A stairway leads from the tipple floor, alongside of elevator *M*, to the motor room, and a ladder is provided from the motor floor to the screen room.

Power Plant

The power plant consists of two buildings as shown in Fig. 5. Both buildings have 12-in. brick walls with fireproof roofs. The boiler house is 49 ft. wide by 60 ft. long; it is equipped with four 150-h.p. boilers, built by the Springfield Boiler and Manufacturing Company. The engine and generator room is 28 ft. 6 in. by 44 ft.; it is equipped with an 18x36-in. Danville Hoisting Engine Company's hoist.

A 175-kw. generator, 250 volts, direct current, furnishes power for the tipple motors. The generator is direct connected to a Ridgway engine.

Organizing Rescue Work in Mines

The report of the committee appointed last October "to frame proposals for the making of an order or orders under the Mine Accidents (Rescue and Aid) Act, 1910," has been made. It is proposed that unauthorized persons shall not be allowed to enter a mine after an explosion of firedamp or coal dust, or after the occurrence of a fire, for the purpose of engaging in rescue work.

Competent rescue brigades must be organized and maintained at every mine on the following scale: one brigade where the underground workers number less than 250; two brigades where more than 250 or less than 500; three brigades where more than 500 and less than 800; four brigades where more than 800. This provision will be deemed to have been complied with where less than 100 underground employees are engaged, when the privilege is acquired of calling for a brigade from a central rescue station. Furthermore, one clause of the proposed regulations empowers the Secretary of State to exempt such a mine from this order if it is so situated that the organization of a central rescue station from which it could be served is impracticable.

Organization of Rescue Brigades

Rescue brigades must consist of not less than five persons employed at the mine, carefully selected on account of their knowledge of underground conditions, coolness and powers of endurance and certified to be medically fit.

Members of brigades must be instructed in the reading of mine plans, in the properties and detection of poisonous or inflammable gases and in the use of the various rescue appliances. Each brigade is to have a captain selected from its ranks. Members of brigades must undergo a systematic course of training, and arrangements are to be made at the mines for summoning the brigades, as soon as their services are required.

In the event of failure to organize the requisite brigades, by reason of the necessary number of underground workers declining to act in that capacity, the owner, agent, or manager of the mine shall be penalized in no way, provided he has afforded every opportunity for organization and made a bona fide attempt to arrange for the supply from a central rescue station of such rescue brigades as he is unable to provide at the mine.

Portable breathing apparatus in the proportion of two sets to each brigade are to be maintained at every mine, and the apparatus must be capable of enabling the wearer to remain for at least one hour in an irrespirable atmosphere. This provision is to be considered as complied with when the privilege is acquired of calling for such appliances from a central rescue station, if the latter is not more than 10 miles distant and connected by telephone with the mine.

It is required that there shall be provided and maintained at every mine: 1. Two or more small birds or mice for testing for carbon monoxide. 2. Two electric hand lamps for each brigade, ready for use and capable of giving light for at least four hours. 3. A safety lamp for each member of the brigade for testing for firedamp. 4. Tracings of the workings which have been brought uptodate within not more than three months, showing the ventilation courses and all doors, stoppings, etc., and distinguishing the intake air from the return air by the use of a different color of ink.

Equipment of Central Rescue Station

At each central rescue station, not less than 15 complete sets of apparatus are to be maintained, with means of supplying sufficient oxygen or liquid air to enable this apparatus to be used constantly for two days and with the necessary means of charging such apparatus. Twenty electric hand lamps, four sets of oxygen reviving apparatus, ambulance boxes, together with antiseptic solution and fresh drinking water; cages of birds and mice, and a motor car are to be in constant readiness.

Rules for the conduct and guidance of persons employed in rescue work, such as may appear best calculated for the carrying out of rescue operations, must also be formulated and kept at every mine.

Stone Dust in Mine Explosions

By R. Dawson Hall

Stone dust as an immunizing agent against explosions has many important properties which should be considered in addition to its merely nonbituminous nature and quantitative presence. Its density, chemical composition and conductivity, the size and shape of the particles, the specific heat and temperature of dessication are all factors to be taken into account.

In a letter, published on Jan. 21 of the present year in *The Engineering and Mining Journal,* I commented on the action of air-borne bodies when stopped by the interposition of a diaphragm or by the reverse action of an incipient explosive discharge or "blownout" shot. I attempted to show that these air-sustained bodies, because they were traveling with equal velocity and had greater density and consequently greater momentum than the medium in which they traveled, continued on their way after the air ceased to advance. Thus these dusts and other solids approached the diaphragm, explosive discharge or "blownout" shot closer than the air in which they were severally traveling and thus aggregated in larger percentage near the disturbing factor.

Mechanics of Immunization

Seeing that "stone dust," as all nonbituminous dust is misleadingly termed, has a density about 1.8 times greater than the dust of pure coal, it is a justifiable inference to assume that, other things being equal, the stone dust will advance toward the disturbance further than the coal dust. The word "advance" here and hereinafter is used relatively and means an advance, a slower retardation or a retarded change in direction.

But this advance may be assumed, also, to be favored or resisted by the nature of the dust, a cuboidal dust being more readily stopped than a spherical, and a spherical dust being less persistent in travel than one which is lenticular and with more spread in a horizontal plane than in a vertical. A thin scaling shale dust in this manner resembles an aëroplane, easily sustained, but freely traveling against a suddenly opposing wind by virtue of its own previously acquired momentum.

It is to be assumed, furthermore, from a consideration of the laws of nature and from observation of the action of a hurricane, that the longest dimension of any body propelled by a medium is in the direction of the flow of that medium, granted that the body be free to turn and also that the next largest dimension is so disposed horizontally as to resist most the possibilities of falling under the influence of gravity.

Immunizers in Mine and in Laboratory

Consequently, from a laboratory standpoint, the best dust for immunizing a gallery from explosion is a dust of a flat, multi-stratified, aëroplanic nature, not only well ground but well weathered into thin flakes, easy for swirling air currents to pick up, able to travel with minimum resistance, dense enough to project itself freely through the enveloping air into the very forefront of the disturbance, and free of any bituminous content which might aid an explosion. These are the primary desiderata, mostly mechanical, of a pulverized stone for use in an explosion gallery for immunization.

But a truer theory, embracing the conditions found in a working mine, would suggest that a dust, which will cement well with the coal particles on the floor of the mine to form a hard pavement, resisting disintegration and the elevation of its material by the air, will be better suited to produce immunization than a dust of so dry a nature that it has not enough cementing value to render that floor coal dust innocuous, even under continued travel.

The shape of coal particles is cuboidal, of sandstone, spherical and of shale, mostly lenticular. Consequently most forms of stone dust are of such shapes that they travel further than most forms of coal dust when projected.

Moreover, not only are stone dusts projected further by reason of their shape but they are also raised more freely than their relative densities as compared with that of coal would indicate.

Thermic and Thermochemic Considerations

There are some other considerations. A lenticular dust will be more readily heated than one which is either cuboidal or spherical, especially the latter; consequently it will have more power to lower the temperature of incipient explosion.

Most stone dusts have a large quantity of combined moisture in their composition while others contain carbon dioxide, which is driven off at and below a red heat. This makes their power to lower the temperature of an explosion far greater than a mere consideration of their specific heats would indicate. Where carbon dioxide is given off, it must tend to prevent combustion of the coal dust. Shale dust and clay dust lead among the hydrated bodies and may be looked upon almost as "tabloid" forms of water. A rich clay may easily contain as much combined moisture per pound of clay as will be found in saturated air per pound of suspended coal dust. Sandstone dust contains but little combined water; what there is, being contained in the hydrated reconstructions of its original cements. It is hardly permissible to call attention to the obvious fact that dehydration and decarbonization will proceed more rapidly, if the dust be fine or lenticular, than if in any other condition.

Sensible Heat of Stone Dust Inconsequential

But to show the inadequacy of the specific heat to explain the whole caloric absorption of a heated dust of clay or shale, the following calculations are made:

Suppose the dust chosen, to have a specific heat of 0.2 and that this value is correct between temperatures of 32 deg. and 3632 deg. F., a range of 3600 deg. A pound of such dust heated to the upper limit would absorb 720 British thermal units.

Suppose that the chemical composition of the pound of dust is represented by the formula $Al_2O_3\ 2SiO_2\ 2H_2O$, which would give 0.139095 lb. of combined moisture and 0.860905 lb. of residuum after heating and complete dehydration. Assuming that this residuum has a mean specific heat of 0.2 in the aforementioned interval of temperature, the number of British thermal units stored up in it will equal:

$$0.2 \times 0.860905 \times 3600 = 619.85\ B.t.u.$$

Taking Mallard et Le Chatelier's figure for the average specific heat between 32 deg. and 3632 deg. F., namely, 1.22, instead of Rankine's value in the formula for the total heat of superheated steam, we have $0.139095\ (1092+1.22\times3600) = 1047.17$ B.t.u. Adding this to the units of heat absorbed by the residuum as calculated above, viz., 619.85 B.t.u., we have 1667.02 units, which result is 2.32 times higher than was obtained by assuming an even caloric adsorption of 0.2 unit per degree of rise of temperature for the undecomposed body.

The specific heat of steam I have quoted appears large and it is probable that is not truly a specific heat at all but a combination of that heat with heats of partial isomerism or dissociation. Perhaps this will account for the differences between Mallard et Le Chatelier, Berthelot et Vieille and D. L. Chapman, the interatomic changes possibly not being equally marked in the course of their several examinations. The Berthelot value would be 1.62 and the Chapman value but 0.87 instead of 1.22 as given for the specific heat used above and based on Mallard et Le Chatelier. This conjecture relative to the cause of the discrepancy in results is perhaps unwarranted, and may well be due to methods in measurement rather than to true differences of heat adsorption.

But to Berthelot must be credited the other statement that the so called specific heat (*chaleur spécifique*) is not a simple quantity, but a compound of the true specific heat with the heat demanded by "that work of molecular loosening of the compound gas which produces no change in its composition and also the further work of dissociation, that is to say, of decomposition, properly speaking (*travail de désagregation moleculaire du gaz composé, sans changement dans sa composition chimique et le travail même de dissociation, c'est à dire de décomposition proprement dite*)".

HEAT OF COMBINATION OF STONE DUST

But the difference is far greater than thus set forth, for a large number of units of heat may be expended in producing a separation of the combined water from the slate or clay. I have never seen this quantity determined but any brickmaker will declare that the hold of clay and shale on the water of constitution is very strong.

It has been objected that in the length of time that an explosion lasts, there could be no such change of condition, that it would take an appreciable time for the dehydration of clay and the "burning" of limestone. Still less could such a change occur in time to prevent a blownout shot or flaring-up of methane from developing into a violent explosion.

It has been found, however, that in the spectrum of an explosion in a test tube, the lines of sodium made their appearance, showing that despite the short duration of its action, the glass was in a degree resolved into its component parts. It would be feeble in view of the uncertainty with which the rapidity of decomposition can be forecasted to say at what speed heat of great intensity will act on clay and limestone, but the fact just given is at least suggestive that the temperature of an explosion may almost instantaneously resolve some compounds into their major constituent parts.

The readiness to heat and the large amount of dehydration and decarbonization must lower the temperature of incipient explosions, while the mobility of stone dusts due to their shapes and densities must serve, it would seem, to increase considerably their percentage at the vital points.

When M. Taffanel speaks of a 50 per cent. admixture of stone dust with coal dust it is an essential point to remember what are the shapes, sizes, specific heats, conductivities, degrees of hydration and temperatures of desiccation of his stone dusts, together with the firmness of the bond with which those combined moistures are retained, and to duly consider that he does not refer to their actual distribution in the explosion zone, but to their quantitative presence on the floor and sides of his explosion gallery—quite a different matter.

That the action of dehydration in cooling flames has received some recognition is shown by the fact that alum is used, or has been used, for that purpose in the manufacture of explosives. Potash alum, it is true, has 45.52 per cent. of water of crystallization in its composition, whereas the percentage in pure clay of the water of constitution is only 14 and of gypsum 20.91 per cent.

Vancouver Island Coal

According to Consul Abraham E. Smith, a Canadian geological survey report states that the bituminous coalfields of Vancouver island are the largest on the Pacific coast. The coal area of the island is divided into five fields, viz., Nanaimo, Comox, Suquash, Cowichan and Quatsino. Of these, the Nanaimo field, with an area of 350 square miles and a content of 1,344,000,000 tons, is most important. Last year the Nanaimo field produced 1,615,160 tons of coal.

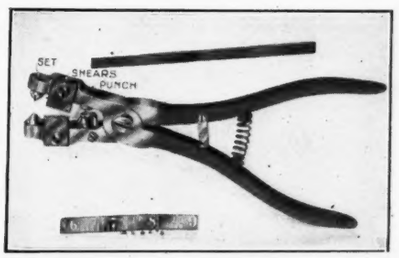
Comox is reported to have an area of 300 square miles, and the same thickness of coal as Nanaimo, making its content 1,152,000,000 tons. Suquash is given an area of 10 square miles, with an average thickness of 3 ft. of coal, or 19,000,000 tons. Recent development shows this field to have two seams of economic value, hitherto unknown, while diamond drilling shows the coal area to be probably six times greater than previous estimate, both in area and content. The Cowichan field is placed at an area of 9 square miles, averaging 4 ft. of coal, or 23,000,000 tons. The Quatsino field is placed at 5 square miles, with an average thickness of 3 ft. of coal, or 9,000,000 tons. The Cowichan and Quatsino fields are the only two lying dormant.

Alberni is likely to be added as a new field. It has long been recognized as probable that coal might be found in Alberni, outliers of the Comox formation having been recognized there. When a railway extension was under construction last fall the steam shovel uncovered a seam of coal, and the company recently started development, with the result that, so far as the slope has been run, about 170 ft., a continuous seam of coal of high quality and of a thickness of 4 ft. has been proved up. From the evidence now available it seems probable that the coal areas of Vancouver island are good for about 3,000,000,000 tons of coal, or enough to supply 10,000 tons a day for 800 years. The Vancouver island coalfields have produced to date coal to the value of $70,000,000.

The yield of the Vancouver island coal mines during the calendar year 1910 is officially reported as 1,616,030 tons, produced by four companies.

Steel Tape Repair Outfit

The accompanying halftone shows a new tape-repairing outfit, somewhat similar to others but embodying a few additional conveniences.



The tool is small, light and durable, and with an extra piece of tape and rivets, repairs are easily made. The punch will cut two thicknesses of the Lufkin or Chesterman tapes or one thickness of heavy chain type. This tool is made by the Pittsburg Instrument and Machine Company, Pittsburg, Penn.

Bath Tubs for Mules

The Philadelphia & Reading Coal and Iron Company is installing for the use of their mules, large concrete bath tanks sunk in the ground of the stable yard scaling 4 ft. deep, 6 ft. wide and 37½ ft. long. A 6-ft shower is arranged to play on the body and head of the mule so as to complete the cleansing. The approaches and floor are corrugated to protect the mule from slipping. The tanks are heated in the winter by a jet of steam. Mr. Newhard, chief veterinarian, is the originator of this improvement.

Hard Running Cars

At some mines, perforated piping is installed to spray the car wheels and tracks on insufficient grades near the tipple, so as to decrease the rolling resistance of the cars and reduce the necessary hand or animal power required to move them. This cleansing action works very well during the summer but in the winter, when cars run still more stiffly, such assistance is not available. It is at best a summer day's makeshift.

Power from Coke Oven Gases

By C. A. Tupper*

The waste gases from beehive and byproduct coke ovens are being extensively used abroad for generating power, but go largely unrecovered in this country. They may be burned under steam boilers or used directly in gas engines.

*Milwaukee, Wis.

In European countries the utilization of coke-oven gases for power generation has long been common practice. The earliest method, and the only one commercially feasible with the old beehive or improved Belgian ovens, involves the use of the gases under boilers for producing steam. This is accomplished in the simplest manner by constructing a large flue parallel to the rows of ovens and providing communication from near the top of each oven, the connection being controlled by means of suitable dampers. Through this main flue the gases are conducted directly to the boiler house. In estimating the power to be obtained, the average is taken as 15 to 20 h.p. per oven, depending upon its size and the quantity of volatile matter contained in the coal.

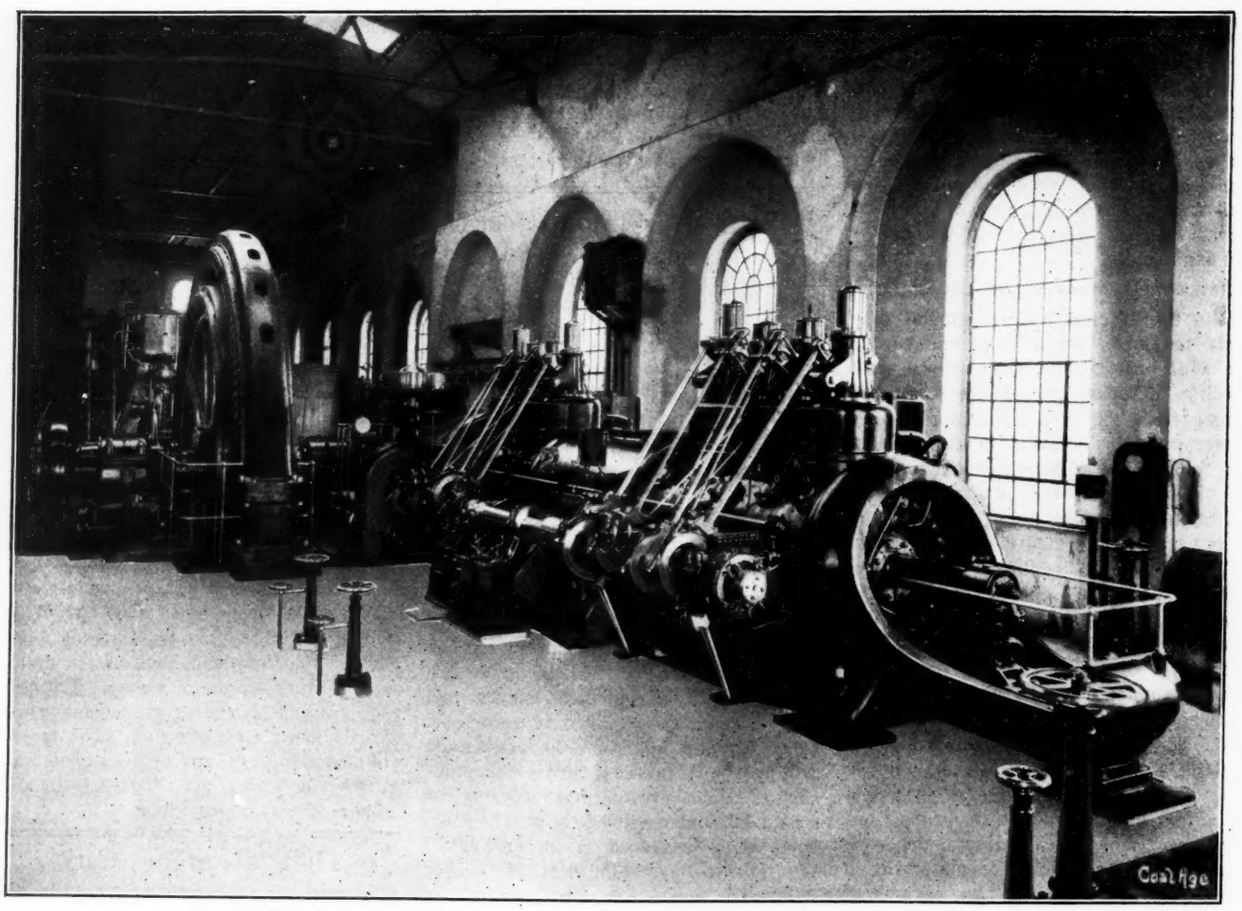


FIG. 1. GAS ENGINE OF 1000 HORSEPOWER, USING COKE-OVEN GAS, BRAMBAUER, GERMANY

With such an arrangement, while the ovens are in service, no coal need be used for generating the power required at a coking operation, other than that which is being treated; and the only charge for fuel is represented by the investment in the flues, their depreciation, etc. Also the expenses of handling fuel, which amount to a considerable item during the year, even when the fuel itself as mine waste can be secured at little or no purchase cost, are eliminated.

Experience with this method has been quite satisfactory, not only abroad, but also in the United States wherever it has been tried; and, if merely a small amount of power is needed, or its use is intermittent, such a plant is to be recommended, for various reasons, in preference to the more costly equipment for gas-engine operation described below. The principal difficulties arising heretofore have been due either to excessively lean gases, fit for nothing more than utilization in economizers or regenerators, or to deterioration of the flues as the result of extreme heat. The latter has also been accompanied by warping or melting of the dampers, both in the main flue and the feeders, even as far as the boiler house. All such troubles can, however, be remedied by proper design and construction and the use of suitable materials.

USE OF GASES FROM BYPRODUCT OVENS

Where byproduct ovens, such as the Koppers, Otto Hoffman or Semet-Solvay, are used, the installations made in the same vicinity usually include mechanical equipment for other extensive operations, such as mining, iron and steel making, etc., and the erection of a large central power plant becomes a matter of economy. Therefore, a heavy initial investment, if wisely planned, may effect a

material reduction in running costs, particularly as the gases from byproduct ovens can be utilized, after cleaning, directly in gas engines, thus securing a much higher thermal efficiency than is possible under boilers. The gases from a byproduct oven are, of course, much richer and more suitable for this purpose than the hot gases from one of the beehive type.

Now, assuming that a ton of coal, as charged, gives 9900 cu. ft. of gas, which is a fair average, and that from 60 to 65 per cent. is needed for heating the ovens, there will be available for power generation a minimum of 3465 cu. ft., a figure which is often exceeded in practice. Experience shows that this yields 5½ to 6 h.p. for each ton coked per day of 24 hours continuous operation.

In the cleansing of coke-oven gas it is necessary to remove both the various tar products which it carries in suspension and the more intimate mixtures of sulphur and cyanogen compounds commonly found in such gas.

Evil Effects of Tar and Sulphur in the Gases

The tar products, if not thoroughly removed, are the principal cause of fouling the induction parts and valves of a gas engine, as well as its cylinder, and frequently cause premature ignition, sticking of the regulating mechanism, etc., while all sulphur compounds that reach the cylinders turn into sulphurous acid during combustion, are converted into sulphuric acid by contact with moisture and rapidly eat away the eduction

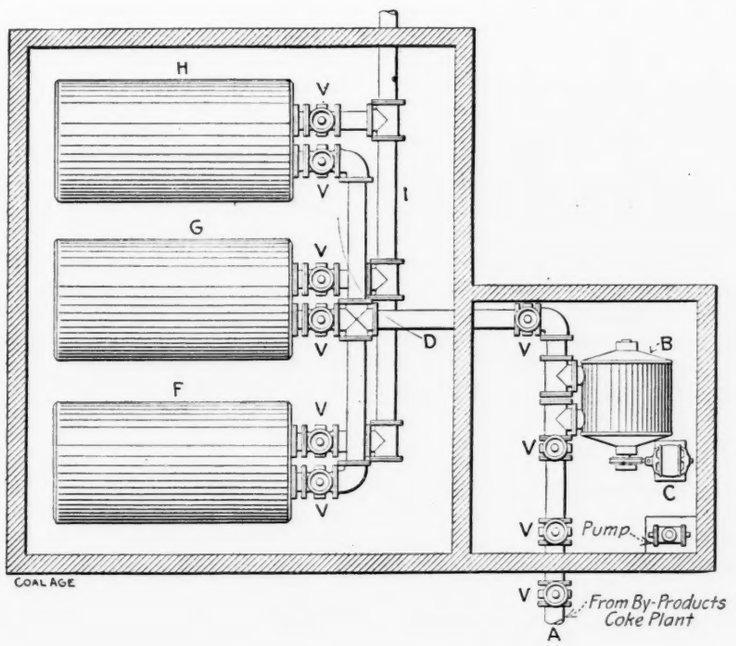


Fig. 2. Purifying Plant

From the theoretical standpoint this sounds well. In practice, however, its value has often been minimized or destroyed by failure to observe one of the fundamental conditions of utilizing waste gases for internal-combustion engines, which is the installation of an efficient cleaning plant. To insure continuous operation, the purification of the gas is a primal necessity, for, since the gas is admitted directly into the engine cylinders, all the noncombustible elements, which would remain in the cylinders and clog them or erode their surfaces, must be carefully eliminated. Such precaution becomes of especial importance when the engines are required to operate continuously and there is little or no opportunity for shutdowns to clean the cylinders.

parts. Since it is necessary to use water in cooling and muffling, there is always danger of destroying vital parts of the mechanism if the sulphureted hydrogen is not prevented from entering.

The tar products which the gas carries in the form of vapor are, of course, pretty thoroughly removed in a modern byproducts plant, or may be otherwise separated by any acceleration in the cooling of the gas; but a residue remains which must be caught and retained in suitable tar washers, of which a number of satisfactory types have been evolved.

The separation of the sulphur and cyanogen compounds is considerably more difficult but, at the same time, far more important. In illustration of their destructive power, reference has been made above to sulphurous acid, which, as sulphureted hydrogen, is the commonest compound; but there is also sulphide of carbon, occurring in smaller quantities and presenting greater difficulties in its removal, and the cyanogen compounds, which form prussic acid during combustion and also act destructively on all mechanical parts subject to contact with them.

Several different methods of purification have been brought out in Germany; and in the accompanying sketch, Fig. 2, is shown one of the most successful of these plants for cleansing coke-oven gas. This was designed for use with a gas engine of 1000 h.p., supplied by Haniel and Lueg, of Düsseldorf, for the Gerkschaft Minister Achenbach (Minister Achenbach Colliery), with mines and ovens located at Brambauer, near Dortmund, in Westphalia, Prussia. A photograph of this engine is shown in Fig. 1.

Gas-purifying Plant

In Fig. 2, *A* represents the large gas main leading from the byproducts coke plant which the company operates, and *B* is a cylindrical rotary washer, of the Zschocke type, where the tar elements are thoroughly separated, together with the residue of ammonia not recovered in the main works. At *C* may be seen the alternating-current motor which, by means of reduction gearing, drives the washer. Through main *D* the gas, which is then charged only with compounds of sulphur and cyanogen, passes to feeders under the wrought-iron tanks *F*, *G* and *H*, where, by means of suitable vents, it is evenly diffused.

In these tanks bog iron ore is spread out on wooden hurdles, or wicker frames. In rising, the gas comes in contact with the ore, so that sulphides and ferrocyanide are formed, completely removing all noxious chemical elements. The purified gas then flows through the main *I* to the gas holder.

It is stated by the colliery officials that, after runs of two to three months or more, "no fouling worth mentioning" has been found in the cylinders or valve chambers of the engine, and there has been no clogging of the gears, thus demonstrating that the cleansing plant does the work for which it was designed. The layers of ore are automatically shifted, during operation, so as to regenerate them by exposure of their surfaces to the air; an oxidizing process then takes place, and the tanks can thus be used continuously until the mass is completely saturated. In practice it is usual to have two in service while the third is being recharged.

The matter of dust in suspension does not enter seriously into the problem of purification, as it previously settles or is removed during the recovery of the byproducts, but any which the gas may still contain is caught by the rotary washer, *B*.

High Thermal Efficiency

It has been the experience of Messrs. Haniel and Lueg, mentioned above, that, with the use of gas engines and a suitable purification plant, the waste gases from byproduct ovens will yield nearly double the thermal efficiency, for power purposes, that they would if utilized to generate steam. The idea is one that has been extensively applied in Germany and other countries of Europe but has thus far made little, if any, headway in the United States.

This is probably owing partly to the fact that the principal byproduct ovens are situated in or near large cities, where the gas can be sold for illuminating and heating, and partly to their location, more recently, adjacent to steel mills or other large works where the plan of the power equipment was decided upon previous to their erection. However, the increasing opportunities for the profitable application or sale of electric power, and the extension of coking operations to new districts, will render the subject one well worth studying for the future.

The Coal Dump

A fall of 3 per cent., is often provided on the approach road for the mine cars to the tipple. This is somewhat excessive, but 2 per cent., where the individual cars are handled, is a minimum and 1½ per cent., where large trips are dropped forward without mechanical assistance. Where long trips are to be dropped, and where there is not sufficient available fall, the tracks should be doubled or trebled, giving the motive power an opportunity to place the cars near the tipple. This is often the better arrangement as it reduces the travel of the mine car dropper.

When the coal is fragile, the grade of the mine tracks above the tipple should be reduced to the minimum at which coal cars can just drop in all seasons of the year. When the coal is to be dumped for coke use or where the markets will buy coal with a large percentage of slack, there will be a gain in the steep grade so long as the car dump and the tipple are stout enough to resist the strain.

It is well to remember that chutes are built at the angle at which coal just slides and to save it from breakage are made no steeper. If the chutes clog they can be cleaned by hand. When the chute cannot be reached for cleaning, the grade must be increased. But no storage can be obtained where chutes are set on the angle on which coal just runs, for to store a body of it, part must travel over a bed of coal and the minimum angle of travel will be greater. Arranging for such storage, chute grades are necessarily increased and if the chutes be emptied the fall of the coal will not be without excessive breakage. Even if the chutes are full, the breakage in the storage bins will be great. Any lump of coal which stops the forward flow will have to take up much of the dynamic energy of the coal above. This is why storage chutes are not more general, apart from the difficulty in obtaining tight, easily operated doors.

Installation of Power at Collieries

Special Correspondence

In the course of a paper on "Some Considerations Affecting the Installation of Power at Collieries," read before the Mining Institute of Scotland, Frank Anslow refers to the controversy now raging as to the relative advantages of the three-phase and the direct-current systems for colliery work. He says that for all practical purposes each system is equally dangerous, or perhaps it is better to say equally safe, if properly installed under conditions suitable for the system selected. Attention should be concentrated upon the question of rendering existing installations safer. Much can be accomplished in this direction, as many of the plants are at least from 10 to 15 years old, and desirable modifications may not only afford greater safety in working, but probably result in increased economy.

The possibility of electric shock is always present no matter what system is employed, and for all practical purposes the danger is independent of voltage, as the lowest practical has been shown to be fatal. The possibility of shock can be comparatively easily eliminated in all generating, motor and other plants by earthing, with the exception of coal cutters, which are more difficult to deal with. The greatest danger of shock, however, is from the cables, including main, distribution and trailing cables. In the mines of Scotland this danger is particularly prominent, owing to the wet and low seams, the latter affording the possibility of men getting into contact with the cables. The arrangement of the cabling system is necessarily a matter depending on local conditions. Armored and unarmored cables both possess advantages, but whichever type is selected great care in the installation thereof, with constant supervision, is the essential and only safe manner of dealing with cables if fatal accidents are to be avoided.

Main Objection to Direct-current Plant

One of the main objections raised to a direct-current plant is upon the score of sparking. The improvements in the design of such a plant have resulted in practically sparkless commutation, even under severe overload conditions; however, it cannot be disputed that the danger of the ignition of gas or coal dust from this cause still exists. Mr. Anslow points out, however, that this danger is also present with alternating current slipring motors, and also in a modified degree with those of the squirrel-cage or short-circuit type.

To earth, or not to earth, is at present a great question, and there are many advocates both for and against. Too frequently, however, the problem is met by a most unhappy compromise of partial earthing. If earthing is attempted, it must be carried out effectively, and generally speaking, two main earth plates should be employed, one on the surface and one below ground in the shaft sump or other suitable position.

These two plates should be connected by a main wire, which should run the full extent of the installation, and all electric or metallic work in connection therewith should be connected to it by wires of suitable section. The alternative of a number of local earth plates is sometimes preferred, but the difficulty in this system is to obtain a good earth, and the main wire will appear to offer, on the whole, the best solution.

As Concerns Large Hoisting Plants

In dealing with large hoisting plants, Mr. Anslow points out that an equalizing system is usually necessary to reduce the demands upon the generating station or supply mains, and then he recalls that fans and pumps require motors to run them, (a) at a low or medium constant speed; (b) at a high constant speed; (c) at variable speeds. In the first case, direct or alternating-current motors are equally suitable; in the second case alternating-current motors can be more easily constructed for high speeds, and no commutation troubles are involved if squirrel-cage machines are employed. Frequently, high speed is not possible with alternating current owing to the low periodicity of the power company's supply. When variable speeds are necessary, direct-current is usually preferable, as the speed variation properties of alternating-current machines cannot be compared with those of direct current.

Direct-current coal cutters, from a working standpoint, are superior to those operated by alternating current, but the latter type has proved itself reliable and satisfactory. There is another possibility with regard to coal-cutting machinery, that is, by the use of compressed air they may be operated from an electrically-driven compressor. Such a combination affords many possible advantages, especially where a number of cutters are employed in a small area, as these can all be supplied from one compressor, thus securing the advantage of compressed-air cutters and the economy of electrical transmission.

Colliery Dwelling Construction

By A. T. Shurick

This is the second of a series of articles on miners' dwellings. In this number the foundations are discussed, and the designing and carpenter work taken up in detail.

NOTE—The first article on "Colliery Dwelling Construction" appeared Oct. 21.

The kind of foundations used is dependent on the character of the building and the extent of funds available. They may be posts, piers or walls. Posts are used only on the cheapest or more temporary structures and may be the ordinary round-prop timber used in the mine or 4x4-in. or 6x6-in. timbers. They are driven in the ground and sawed off to the required hight or may rest on a flat stone or short piece of plank acting as a mud-sill.

Piers are built of either dry- or wet-rubble masonry, brick or concrete. Dry-rubble is adaptable only for short piers consisting of one stone on top of another. When using wet-rubble and with stone of average quarrying qualities, it is not consistent with good results to construct a pier less than 20 in. square. Concrete is seldom used on work of this character, but should it prove desirable a 10-in. square pier properly reinforced with ¾-in. vertical rods at each corner and resting on a spread-footing, 12-in. thick and 24-in. square, will give satisfactory results for ordinary hights. The concrete should be made soft and in the proportion of 1:2½:5, the large aggregate being sized to pass a 1-in. screen. Brick piers laid up in lime mortar give satisfactory results. On the whole piers of any kind are not good construction on work of this character as the space beneath the building will often be used as a hog-pen or made a repository for refuse, thus producing unsanitary conditions. In northern latitudes this construction leaves the bottom of the building exposed, making it cold.

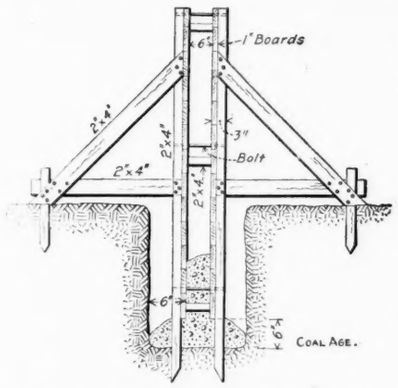


FIG. 1. FORM FOR CONCRETE WALL

A solid wall does not add materially to the cost of the building, considerably enhances its value and is one of the most common footings met with in this class of work. The wall may be of dry- or wet-rubble, brick or concrete. A dry wall when well put up would be amply sufficient were it not that they are being continually pulled down by the children or the miners themselves who sometimes wish to gain access to the interior. A rubble masonry wall, laid up in either lime or cement mortar, is probably the most satisfactory and on the whole the most common wall used on this work.

These walls are commonly made 18 in. thick, although with a stone that quarries well a competent mason can put up a satisfactory 16-in. wall. Headers 8 in. thick and 18 in. wide should be required every 4 ft. in length, and 3 ft. in hight, no two consecutive vertical joints should be allowed and the stone should be laid on its natural bed. The mortar used may be either lime, hydraulic lime, lime and cement or cement. A lime mortar of from 1:2 to 1:4, depending on the quality of the lime and the cleanness of the sand, will give entirely satisfactory results if the wall is allowed to season and then pointed with a 1-cement, 1-lime and 3-sand mortar. In the case of a cellar wall, hydraulic lime or cement should be used, and if the stone is soft or porous it is a good plan to give the outside a ¾-in. coat of 1:2 cement mortar.

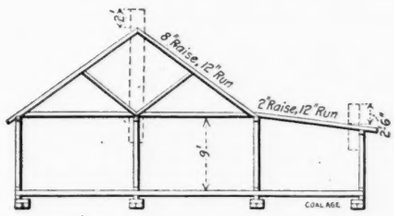


FIG. 2. METHOD OF ERECTING

CONCRETE FOOTINGS

Should it prove desirable to use concrete for the footing a very light wall will suffice when using a 1:2½:5 mixture of one of the standard Portland cements. When the ingredients can be placed on the ground at a moderate cost, and a portable machine mixture is available, the cost of this work will often run below that of rubble masonry.

Fig. 1 shows a method of constructing the forms for placing the concrete. They may be built of either 1-in. or 2-in. boards which should be smooth on one side and one edge, and preferably, tongued and grooved. The studs are of 2x4-in. and when using 1-in. boards they should be placed on 24-in. centers, while for 2-in. boards 5-ft. centers are sufficiently close. Forms of 2-in. boards require less labor to build, have a higher salvage value, and under average conditions are probably more economical. Struts of 2x4-in. are placed between the faces of the forms, which are then drawn up tight, either with bolts or wire; the struts are removed when the concrete reaches them, the wires left buried, and the bolts taken out after the concrete is partially set.

For the ordinary four- or five-room house, with walls not exceeding 6 ft. in hight, a thickness of 6 in. is sufficient, while for a house with an 8-ft. cellar, the walls may be made 10 in. at the bottom and 8 in. at the top. To provide for freezing, the ground should be excavated 4 ft. in the Northern States, and 3 ft. in the Southern, and spread footings 18 in. wide and 6 in. thick used.

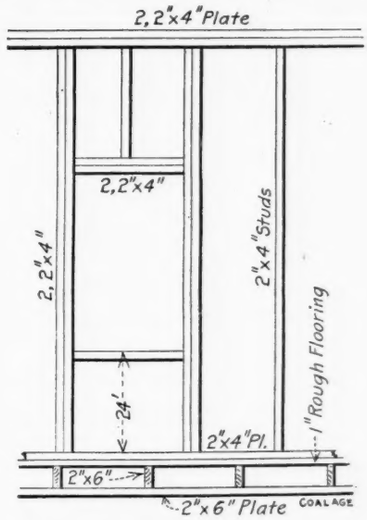


FIG. 3. WINDOW FRAMING

The abundance of good stones which are commonly found in the coal formations usually makes some form of stonework cheaper than brickwork, but when it may prove desirable to use the latter, a 12-in. wall, laid up in lime mortar, will suffice for the ordinary four- or five-room house.

Chimneys—The chimneys are almost entirely built of brick. The flue of the main chimney, to which two or more stoves are to be connected, should not be less than 8x8-in., while that on a lean-to addition, having usually only one stove, may be made with a 4x8-in. flue. The flue may be lined with either lime or cement mortar, preferably the latter, or the

joints may be struck with the point of a trowel; care should be taken to have the lining as smooth as possible.

Fig. 9 shows the details of an ordinary chimney for the average three- to five-room house. Since they are comparatively light they are usually supported on the partitions about 6 ft. from the floor, thus effecting an economy of this much brickwork. The walls are commonly made 4 in. thick, or the width of one brick, which provides ample stability although the efficiency of the chimney will be materially increased by having 8-in. walls. The chimney should be carried not less than 2 ft. above the building and topped off with some ornamental effect, the one shown being simple and appropriate for this type of building.

Carpenter Work

Before taking up the work of designing, the engineer should provide himself with a set of the standard rules for the grading and classification of lumber for the district in which he is located. These rules are issued by the Associated Bureau of Grades in pamphlet form and give detailed lists of defects admissible in the different grades of lumber, together with full-sized cross-sections of the various shapes and minimum dimensions. He should also have the catalog from some large factory which will give full-sized sections of different moldings, standard dimensions of doors and door frames, window sashes and frames, etc. By carefully following the catalog and specifying only stock shapes and sizes, an appreciable economy will be effected, since these details require considerable framing when of odd dimensions and can be bought much cheaper manufactured.

Frame houses may be roughly divided into two classes, braced frame and balloon construction. Braced-frame construction is a relic of former times, when mortise-and-tenon joints were cheaper than those made with nails or bolts, because of the high cost of the latter, which were all hand made. In this construction all pieces are carefully fitted into place, important joints being secured with a mortise and tenon, making a well braced and very stable structure. With balloon-frame construction, the pieces are simply nailed together and the structure depends on the sheathing for its stability. This class of construction is the one commonly used in most houses today and costs about one-half that of the braced frame.

Sills—Where masonry foundations are provided for the sills, these need not be larger than 2x6 in. They should be given a half splice at the corners and other points where necessary and set in a mortar grouting, preferably of cement; the underside is sometimes given a coat of linseed oil to prevent the absorption of moisture from the foundation. The sills should be set back 1 in. from the outside face of the foundation, which brings the sheathing even with the face, and allows the siding to extend below the sill, making a weather-tight joint.

Floor Joist—After the sills are placed the floor joist are next set, which for construction of this class, are placed even with the outside edge of the sill, as shown in Fig. 10. A better grade of construction is shown in Fig. 8, in which a boxed sill is used against which the joist butt. Since the floor joist are of rough lumber, the dimensions of which may vary one-half inch or more, they should be sized on the bottom side sufficient to bring the tops all to an even line. For the second floor joist a channel or groove should be cut in the under side to fit on the ribbon or ledger board. To eliminate the possibility of warping, the joist should be laid with the crown or convex side up, the superimposed load then tending to hold them to position.

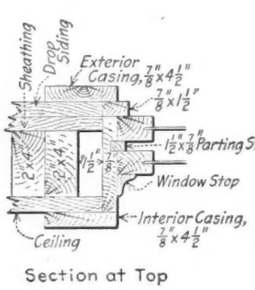
The size floor joist to be used cannot be determined from the usual tables given in the different architects' pocketbooks, since these tables are computed only for the better class of houses. Thus, for instance, in the Architects' and Builders' Pocketbook (Kidder), complete tables are given for the maximum span of floor joist for loads of from 60 to 174 lb. per sq.ft. Most of these tables are computed for a maximum deflection of 1/30 in. per foot of span, an item not usually necessary to consider on this class of work. There is, however, in the same book a series of tables for the safe quiescent loads, uniformly distributed, which may be used to advantage. In computing the permissible loads of a number of typical examples of this class of construction, it has been found the joist are designed for loads ranging from 38 to 50 lb. per sq.ft., according to the values given in these tables. Floors designed for a load of 38 lb. are commonly used and, aside from a pronounced deflection, appear to give satisfactory results.

Flooring—The use of single floors is condoned only in the very cheapest class of construction, double floors, sometimes of the poorest grade, nearly always being used. An average floor for this class of building consists of sheathing for the rough flooring and 1x4-in. or 1x6-in. Nos. 2 or 3 grade of flooring for the finished. The rough flooring should in all cases be laid at an angle of 45 deg., with the floor joist and the finish at right angles to the joist. When both floors are laid in the same direction the unequal shrinkage, due to the broader widths of the sheathing, will draw the finished floor apart. The rough flooring should be nailed at every joist with two 8-d. nails, and the finish blind nailed at each joist with a single 8-d. nail.

Because of the loss due to the tongue and groove and the difference in actual and trade dimensions, a certain percentage must be added to the amount ordered above the real superficial area to be covered. The usual practice is to add 50 per cent. for 3-in. flooring, 33 per cent. for 4-in. and 20 per cent. for 6-inch.

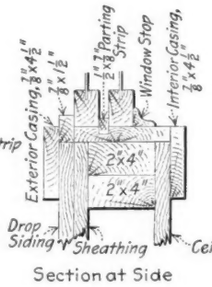
Studs—In the better grade of buildings the studs rest directly on the sills and are nailed to the floor joist, giving strong construction. The methods shown in Figs. 8 and 10, which are details of the houses described in my first article, are sufficiently strong for ordinary purposes, and more economical in materials and labor.

In this method a floor plate is laid on the rough flooring, of the same section as the studs, which provides an even bearing for the latter as well as a nailer to which the studs are spiked. The studs should be of 2x4-in. and may be placed 24 in. on centers except when the interiors are to be plastered, when they must be 16 in. on centers to provide for the accommodation of the lath. All doors and windows should have double studs



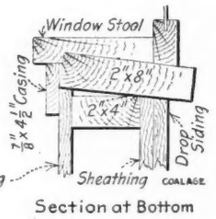
Section at Top

Fig. 4.



Section at Side

Fig. 5.



Section at Bottom

Fig. 6.

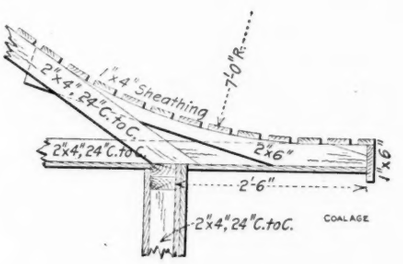


Fig. 7. Details of Shelter

on the sides, and double bridging of the same section as the studs across the top, as shown in Fig. 3.

A good average hight for the rooms is 9 ft., and to avoid waste in cutting, the studs should be ordered in 18-ft. lengths. Partitions are made the same as the walls with the exception that the sheathing is omitted, and at the intersection of the partitions in the four- and five-room houses a support for the chimney should be built, as shown in Fig. 9. On top of the studs is the wall plate, which consists of two pieces of the same section as the studs, the double plate being necessary for the purpose of splicing in order to have it practically continuous throughout.

Rafters and Ceiling Joist

The rafters and ceiling joist for the average house may be of 2x4-in., placed 24 in. on centers, except when it is necessary to provide for plastering they must be on 16-in. centers, as before mentioned. For a shingle roof the rafters should have a one-third pitch and be braced with struts, as shown in the elevation, Fig. 2, which is a cross-section of the four- and five-room houses shown in my first article on this subject. When heavy snow loads are liable to occur, the rafters on the lean-to addition should be 2x6 in., as they are often heavily loaded because of the light pitch.

On the main roof the rafters may butt at the top on a ridge board or against each other, the latter being simpler and probably as good. At the toe the rafters should be notched sufficient to get a bearing the full width of the wall plate and the remainder extended out for the cornice. When the ceiling joist are also the floor joist for the second floor, and the interior finish is to be of plaster, as shown in Fig. 8, they must be proportioned to withstand a certain maximum deflection in order to provide against cracking the plaster. Under these conditions the joist should be designed according to the tables given in one of the standard works on the subject.

Cornice—While anything elaborate for the cornice is not to be expected on work of this character, this detail should not necessarily be entirely neglected. The detail of the cornice shown in Fig. 10, which is the same as used on the three- and five-room houses shown in last week's issue, is simple, economical and very appropriate for this class of work. The projection of the rafter, cut as before described, is boxed in with a 1x4-in. facia and a 1x12-in. plancher, as shown, and an appropriate frieze and bed mold added.

A somewhat more elaborate cornice is shown in Fig. 8, which, with the exception of the gutter, is the same as used on the superintendent's house, shown in my first article. The details of construction are clearly shown, and while this would not be appropriate for the average miner's house, it is a typical example of that used on houses of a better grade. Many different designs of cornice are possible, but the two here shown are good types for use under the conditions specified.

Siding—The siding may consist of anything from common boards laid vertically with joints covered by some form of 2-in. or 3-in. battens, to a double covering, consisting of sheathing and one of the standard sidings. The former is used only on the very cheapest construction, while the latter is commonly applied to all well-built miners' houses.

The sheathing should in all cases be laid diagonally on the sides and nailed at each stud with two 10-d nails, since it forms an important, if not the only brace for the structure as a whole. In figuring the quantities necessary when laid horizontal do not deduct for the openings, and when laid diagonally allow from ⅛ extra for 10-in. widths to ¼ for 6-in. Considerable waste occurs which makes these allowances necessary. On the good grade of houses of this class one or two layers of a moderate-priced building paper should be laid on the sheathing to eliminate drafts from working through the cracks and joints.

The finished siding is furnished in a number of different shapes and by using a miscellaneous assortment of the design's available a certain individuality is given the different houses.

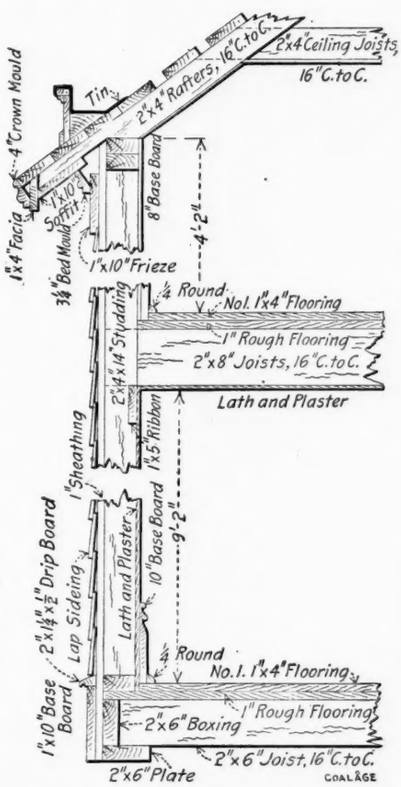


Fig. 8. Construction Details

The different forms of drop siding have a uniform thickness of 1 in. except where chamfered and rabbeted on the top and bottom edges respectively, to fit the adjoining lengths. They run in widths of from 4 in. to 8 in. and the trade names of some of the more popular designs are Drop siding, Channel and Novelty Rustic and Single and Double V-Rustic. Some of the cheaper grades are made in double widths, and have an imitation joint cut through the center.

In figuring the amount of siding necessary, add 20 per cent. to the actual superficial area for drop siding, 50 per cent. for lap siding laid 4 in. to the weather and 33 per cent. for the same when laid 4½ in. to the weather.

Roofing

Shingle roofs are used almost exclusively for this class of houses because of their economy, permanency and excellent results. Shingles are usually 16 or 18 in. long and of random widths varying from 4 to 7 in.; they are also manufactured in lengths up to 24 and 27 in. and widths of 14 and sometimes 16 in. They are usually put up in bundles of 250, four bundles to the "thousand," which is the trade term for the equivalent of one thousand shingles 4 in. wide.

Shingles may be laid on sheathing or shingle lath, the latter being preferable since it permits a certain amount of ventilation underneath, allowing the material to dry quicker, thus preventing decay. Shingle laths are generally 1¼ in. thick by 2 or 3 in. wide and are placed on from 4- to 8-in. centers, according to what exposure is desired for the shingles. Common shingles are laid with from 4- to 6-in. exposure to the weather and, with the former, 1000 shingles will cover 100 sq.ft. while with the latter the same number will cover about 160 sq.ft. On a one-third pitch (8 in. rise to 12 in. run) the shingles should be laid 4 in. to the weather; on a one-half pitch, 4¼ to 4½ in., while for vertical walls they may be 5 or 6 in. to the weather.

Interior Lining—The interior lining for the average miner's house should be of some form of ceiling. While a plaster finish is given to the better-grade houses, the high first cost and the continual outlay necessary for repairing makes the use of this lining very expensive for the ordinary house.

The ceilings run in various shapes having a thickness of from ⅜ to 1 in. and widths of 4 and 6 in. A good average lining for miners' houses is ⅝x4 in. beaded ceiling or 1x6 in., the latter being probably about as economical as the former since the rules in regards to the actual area to be covered to the actual material required are the same as for the flooring. The excess required for the 1x6-in. would be about one-half that for the ⅝x4-in. and the labor would also be less.

Ceiling is also manufactured finished on both sides, Double Beaded or Double-V as the case may be, for use where very thin partitions would not be objectional This construction is sometimes used for the partitions of miners' houses of the cheaper class but is seldom applied to the better grade houses except in some minor position, such as a closet or pantry.

Doors and Windows

The doors commonly used in good construction of this class are 1⅛ to 1¾ in. thick, from 2 ft. 6 in. by 6 ft. 6 in. to 2 ft. 8 in. by 6 ft. 8 in., of No. 1 or 2 grade with a four- or five-panel design. A good average assortment of doors for the well built house would be:

Front door, of No. 1 grade, five panel, 1¾ in. thick and 2 ft. 8 in. by 6 ft. 8 inches.

Rear door, of No. 2 grade, four panel, 1⅜ in. thick and 2 ft. 8 in. by 6 ft. 8 inches.

Interior doors of No. 2 grade, four panel, 1⅛ or 1⅜ in. thick and 2 ft. 6 in. by 6 ft. 6 inches.

Closet and pantry doors, of No. 2 grade, four panel, 1⅛ in. thick and 2 ft. 4 in. by 6 ft. 4 inches.

These doors are all of standard dimensions, such as will be readily found in stock.

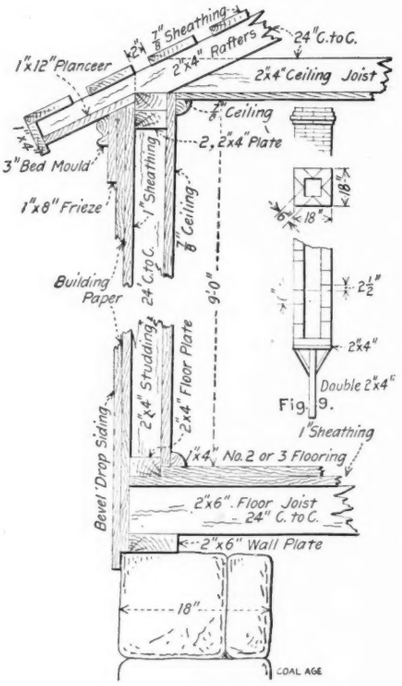
A good average window for these houses is a two-sash, spring-bolt, plain-rail, 1⅛-in. thick, with 8 lights, 12x14 in. This is a fair-sized light and yet not so large as to be very expensive in replacing. If a better class of construction is desired, a balanced window with weight and pullies may be used instead of the spring bolt, in which case the sashes should be check rail instead of plain rail.

The details of a simple window framing for a check-rail spring-bolt window are shown in Figs. 4, 5 and 6. When the windows and doors are of standard dimensions the frames for them can be bought ready made much cheaper than framed on the ground and dimensions and detailed drawings can be obtained from the manufacturers.

Miscellaneous Details

The detail for a shelter, similar to that used on the house shown in Fig. 7 of my previous article, is given in Fig. 7. The one shown in the illustration extends so low as to interfere with the screen door, which difficulty may be overcome by using the method shown in the detail drawing. This detail is one of the bungalow effects, and a certain judicious application of it in different ways will add much to the appearance of the completed town.

A detail of the method of supporting the chimney at the intersection of two partitions, as in the center of a four-room house is shown in Fig. 9. This method is



FIGS. 9 AND 10. DETAILS

sufficiently strong to carry chimneys 12 to 16 ft. in hight, the maximum which these usually attain.

Some steps are usually necessary at the entrances to the houses, and in laying these out a good rule is to make the rise between 7 and 7¾ in. and the run the difference between 17 or 18 in. and the rise in inches. This rule gives the actual tread, an allowance of from 1¼ to 1¾ inches being made for the nosing, and the actual run consequently being this much less.

If it is intended to use a briquet binder such as hard pitch or asphalt, be sure to see that there is a supply of superheated steam for the mixers or the binder will not liquify enough to spread thin over the coal and will consequently be wasted.

One Man for One Job

Mining experts with experience in India tell how the "one man one job" system is adhered to in that country. The man who fills steam coal will not fill slack. If he comes to a dike he stays off work until a stonecutter has pierced the dike and got to the coal again. The stonecutter remains idle until he gets another dike to cut. The man who drives galleries for the purpose of "winning out" places quickly will not work in ordinary places. A man working at the coal face will not put up a prop; that is the timberman's job. If a stone falls, a coolie must be brought along to clear it away. A special man looks after the pump and he will neither repair it nor clean the suction pipe if it gets choked up. Robert F. Campbell tells how a fireman will fire a double-flued boiler, but not two separate boilers with single furnaces, even though it took him only one hour to do his day's work. Even at that he will only throw in the coal and draw out the ashes. The coal must be placed at his feet and the ashes taken away by a coolie. A winding engineman will not clean his engine, which is only fit work for a coolie. Every squad of men in a colliery is under a head man, who does no work, but must be paid a little for allowing his men to work. It would indeed appear that for the Indian miner the ordinary trades union would be an unecessary luxury; he is quite able to protect his own labor.

Mining Wyoming Lignite

In the vicinty of Hudson and Lander, Wyoming, is a coalfield which is rarely heard of because of the larger coalfields in the United States and Canada, but it is nevertheless an important one, despite its isolation, since it serves a territory which would otherwise have difficulty in securing coal.

The Hudson Coal Company and the Poposia Coal Company are the prominent operators in this field, and are under the management of H. O. Barber, who is president of both companies. The Poposia Coal Company is a new organization, and is just opening up a large mine which will eventually have a capacity of about 1200 tons per day.

The company is operating in a 12-ft. seam of high-grade lignite coal, all of which is consumed by the railroad, towns, and farms of that territory. As their holdings are large, the mine is being made first-class in every particular, and designed for operating through a considerable period of years. The mechanical equipment, consisting of shaking screens, supports and a special device for raising the coal to the tipple, is being installed by the Ottumwa Box Car Loader Company, of Ottumwa, Iowa.

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This journal is interested solely in matters relating to the fuel industries, and is designed to be a medium for the free interchange of ideas, the detailed description of coal-mining practice, and the expression of independent thought calculated to benefit both operator and miner.

Contents

COAL AGE

The Adrian Mine Explosion

As was foreshadowed in last week's article by Mr. Hall, dealing with the explosion at the Adrian mine, the coroner's jury did not find it easy to come to a conclusion as to the cause of the accident. Twenty witnesses were examined, many of them being men who were at work in the mine on the morning of the disaster. Some of them had worked in Adrian for years and testified that there was no gas in the mines. The inspectors made their examination, but had not completed their report in time for submission to the coroner's jury.

A caving of one of the headings is supposed to have resulted in the fall of a trolley wire and it was thought that the short-circuit thus caused, ignited the dust naturally upraised in great volume by the violence of this same caving. On the other hand, two miners declared to the jury that there was no electricity in the wires shortly before the explosion; moreover, the falls now visible may be the result and not the cause of the disaster.

An inspection of the mine shows that the wire is down over nearly all the affected district. There are large falls of rock in both back and main headings of the 13th Left. In the main heading, several loaded cars were lifted off the track and turned at varying angles. In the back heading, the cars were empty and the force of the explosion broke several of these to pieces. Some coke was formed at the face of the 13th Left. But the examination does not favor one point of origin rather than another, and deductions are hard to make from the indications.

It seems as if the second Adrian explosion is as mysterious as was the first which occurred in 1896. To all appearances, no one was present when the earlier accident took place, and no one was discovered to be missing after the event. So also in the recent disaster; there were no miners where the explosion initiated.

If the accident was caused by exploding coaldust, the force of its action must have been considerably reduced by the presence of a large amount of sand strewn along the haulways as a result of the continuous sanding of the rails. This sand, covered with impalpable coaldust, appeared to be in great quantity in the roadways, and conveyed the impression that the entries were dusty enough to provide a rapid detonation, but examination showed that the greater part of the dust was of an inert nature and therefore harmless.

Sand Filling

The Scranton Mine Cave Commission, in its final recommendations, advised that an engineer be appointed to direct continuously whatever plans might be adopted for the sustention of the city. This advice should not be disregarded. Granting that the engineers engaged by the commission made a practical and otherwise able report, fully justifying the reliance placed on them, yet necessarily there were some details to which they failed to give all the attention which would and should receive consideration from an engineer in continuous residence, in the long course of his observation and practice.

The engineers, Messrs. Conner and Griffith, showed among other things that concrete was inadequate and impracticable, and that culm would be unable to support the strata where the depth was excessive. They urged the use of sand—a material which is but little susceptible to compression or deformation and, therefore, one which has a great supporting power. Unfortunately sand often exhibits other properties. Where it is dry and no binder is present, it will run freely. Should a large crack or crevice occur near a sand pillar, the sand, if loose, would certainly flow into the breach and the surface of the ground would be disturbed, especially if such a failure caused a further breach in the measure or measures above the collapsed sand pillar. Such a further break would be almost sure to occur. The experience in the Rand, where the waste sand of the cyan-

ide tailings is being used for filling, is that sand needs a great deal of constraint, and the miners are said to be afraid of death from smothering, as a result of its sudden, unpresaged outflowing.

There is another undesirable feature in loose arenaceous fillings; they are liable to be swept away by flowing waters. The heavy slag sand fillings in the neighborhood of Cleveland, Ohio, have shown this fault clearly. It is apparent, therefore, that some definite information should be sought as to the possibility of using various forms of cementing materials. Light should also be thrown on their relative values and the best methods of depositing them. Experiments should be tried on the cementing effect of the water seeping through the mine roof.

Let it not be thought that this suggestion contemplates a strengthening of the artificial pillars by cementation, an accomplishment which the report ably shows is impossible, but merely a protection of them from sliding when dry, and spreading or eroding, when in the presence of excess of water. The filler and binder should be deposited in such manner that it merely fills the interstices in the sand and does not collect in local patches, causing undue shrinkage before the weight causes it to take its appropriate interstitial location.

It is probable that eventually, the filler would be found to deform and squeeze into the spaces between the sand particles, but this change in location would not take place till the surface had been severely affected by subsidence. Interesting indeed would be experiments on the nonferruginous sands of the buried Wyoming valley, unmixed or mixed with shales of highly ferruginous type, such as the Mauch Chunk shale or with the slightly iron-impregnated shales of the coal measures, the character of the iron oxide, of course, being as important as its quantitative presence.

At the Myslowitz colliery, in Silesia, ferruginous sand, clay, rock, slag and other débris are used. They are mixed together with bricks, slate and earthy coal. To this is added hot furnace slag—run by launders to the mixing machinery. To quote William H. Storms: "It later becomes a solid mass which can only be broken by a hammer; this is quite in contrast with a sand filling that will run through a knothole at every opportunity."

The only work regarding the cementation of natural bodies of which we have any record is that of Logan W. Page, of the Federal Bureau of Roads. But his experiments were conducted with materials which were not under any pressure and these were not tested under similar conditions to those we are considering. The Federal Bureau of Mines might well make cementation a subject of its valuable research work. It is time that the United States contributed some thought and some examples in the development of a method, which was here originated, but which has received all its later perfecting and development in Germany, South Africa and Australia.

First Aid Inevitable

There have been severe strictures passed by busy critics on the dangers of incompetence in the rendering of first aid. Such critics would have us believe that aid by the layman may be more harmful than helpful.

First aid is not new. It did not originate in mining with Dr. M. J. Shields. It has not been increased in volume by the American Red Cross, but is as old as man. The only change arises from the fact that through the inestimable work of Major Lynch, Doctor Shields and the Red Cross, aided by a numberless body of corporation doctors, first-aid work has been organized, developed and improved, so that instead of being a positive detriment to the subject it is sure to be a help.

Under the old *régime*, it was customary to use for a styptic a wad of tobacco which could not fail to be infected by all the impurities contained in the mouth of the person by whom it was prepared. The hot breath of a friend mollified the smart but infected the tissues of a wound. It was usual to tear off clothing adhering to a cut. Foul coverings were put on burns and abrasions with resulting adherence and infection. Whisky was given in excess to the injured, with distressing effect. Men were gathered up without bandaging; thus simple fractures became compound.

First aid has been with us for generations, and it is here to stay, whether the corporations assist or resist, whether the Red Cross direct or desist in the good work. The only question is whether it will be effective or dangerous, whether it will injure and kill or help and save life. This is a work to which enthusiastic and self-sacrificing men have devoted their lives, with the most excellent results.

But healthy criticism by the friends of first-aid work is needed. Those who most deplore the first aid of the previous centuries will be the first to condemn the continuance of its thoughtlessness in the new first-aid men, who, with all the instruction so liberally meted out to them, occasionally drop back to the untutored practices of a past age.

The Mine Foremen

At a recent meeting of the New York section of the American Institute of Mining Engineers, during which mine safety was the principal topic of discussion, the impossibility of properly directing the non-Englsh speaking foreign element employed in the mines today was discussed, together with the dangers accruing therefrom. During the discussion it was suggested that the mine foreman, being in the minority, should be required to learn the different languages of the majority.

Should such a rule become effective we wish to extend our sympathy to the foremen. As an example of the inconsistency of such a plan we may take the engineers, men who have been subjected to a rigid mental training over a period of a number of years, part of which training was in foreign languages, and how many of these men today can use them? While we appreciate the fact that the mine foremen are undoubtedly the pick of the employees and naturally have superior attainments, on the other hand their mental training has not been such as would make the acquirement of, say, even three or four languages an easy matter.

The excellent illustration on the front cover of this issue shows shaft No. 2 of the Buffalo & Susquehanna Coal and Coke Company, located near Du Bois, Penn., between that town and Sykesville. This plant was built about 1903 and its workings extend to Du Bois No. 1, a shaft mine formerly opened and operated by the Berwind-White Coal Mining Company, but now owned by the same corporation as shaft No. 2.

COLLIERY NOTES and COMMENTS

Practical Hints Gathered Here and There, and Condensed to Suit the Busy Reader

After Dec. 15, 1911, all underground mine buildings in the State of Pennsylvania must be of fireproof construction. A fine of $500 for each violation is the penalty imposed for disregarding this law.

The Hillside Coal Company of Avoca, Penn., is fighting a mine fire. An opencut is being put down to the bottom of the first vein, a distance of 50 ft. or more, in order, if possible, to head off the fire. The cost of the undertaking is placed at $25,000.

When installing an electric-haulage plant for a colliery of an output of 1000 to 3000 tons per day, it is desirable, when transmitting the power over long distances to install alternating-current machines; a high potential then can be obtained and maintained, with only a slight loss.

An English authority on coal mining says: "The desirability of quickly reversible ventilation in case of need after an accident cannot be overestimated. When planning a ventilation system bear this in mind, as it may save much loss of life and time in case of fires or explosions."

As an important factor in the solution of the smoke nuisance, use a fire box large enough to allow the flames to burn out before they strike a cool surface, when burning a coal rich with volatile gases. If the volatile matter passes easily from the coal at a low temperature increase the size of the fire box or decrease the rate of firing.

When a mine car is built, the two horses on which it is constructed should be set perfectly level, otherwise the car will be in wind, and run on three wheels and show a perverse tendency to leave the rails. Such a wind eventually works out in practice, but it takes several days during which the ill-constructed car is likely to cause much trouble.

Experience has shown that connected workings, combined with large volume air currents, favor the spread of an explosion because of the large supply of oxygen and dust available. The safety of mines, whose gaseous nature demands a strong current, can be greatly enhanced by splitting the air and keeping the different splits as isolated as possible.

Experiments made in France have shown that, with coal containing from 1 to 6 per cent. of ash the dust from this same coal will contain 40 per cent. or over of ash. This increase is evidently due to the admixture of stone dust from the floors, walls, etc. With an ash percentage of over forty it is difficult for coal dust to give rise to an explosion unless it is fired by a store of explosives or a powerful explosion of firedamp.

A recent consular report from Peru states that American coal, although once popular there, no longer has any market whatever. Peru imports coal chiefly from Australia, although some briquets are brought in from Belgium and England. The limited explorations which have been made up to date would seem to indicate that Peru is undoubtedly rich in both anthracite and bituminous coal, but the amount at present mined is small due largely to a lack of transportation facilities.

A direct-connected turbine pump and motor, at present in use at a Scottish colliery, has a capacity of 24,000 gal. of water per hour against a head of 556 ft. The motor is connected to the pump by a flexible coupling, has a capacity of 110 h.p. at 500 volts, direct current, and runs at a speed of 1850 r.p.m. The pump and motor are mounted on a strong cast-iron girder bedplate, so designed that all may be carried through comparatively small roads and otherwise readily handled underground.

The Bolivian Director of Statistics reports that the coal seams in Bolivia are found embedded in a thick stratum of sand stone somewhat resembling the millstone-grit. The coal seams themselves are small, and although of fair calorific values, are associated with many impurities. The soft nature of the stratum in which they are found increases the cost of working since timbering on the Bolivian plateau is almost prohibitive in expense, and all adits have to be lined with stone. Claims have been staked out on the outcrop for some four miles in length, but none are now being worked.

An 8-h.p. "Otto" oil-burning mine locomotive for underground work has the following overall dimensions for a 2-ft. track gage. Length, 3 ft. 11 in. Width, 2 ft. 7½ in. Hight, 4 ft. 7 in. The gearing is arranged to give two speeds, namely, 4 and 8 mi. per hour. At the slower speed, the locomotive is capable of hauling a gross load of about 23 tons, and at the higher speed, a load of about 9 tons on the level. The service weight of the locomotive is about 4 tons. The oil tank is large enough for a double shift of 16 hours. The fuel and water consumption is exceptionally low. For fuel, crude or refined benzol, petrol, etc., may be used.

The British pit pony, as a rule, is a Shetland, Welsh or Moorland pony, or else a little cart horse which is too small for the surface, but can be used in mines not suited to large horses. With these ponies—the Moor and the Welsh—you practically never see a case of glanders, and F. L. Somerset informed the Mines Commission that the spread of glanders depends largely on the system of watering. If the pony is watered from a bucket and the hostler has instructions not to use a bucket to a horse that is running at the nose from any cause whatever, or to keep that horse with his own bucket, there is not much likelihood of the disease spreading.

Early in the 18th century the mine light *par excellence* was a tallow dip set in a lump of wet clay. When gas tests were to be made the experienced miner surrounded the wick of this brilliant light with more clay. The "fireman" of those days, prototype of the modern fireboss, must have been a man of much nerve and little caution, as his duty was to rid the mine of gas by firing it. Clad in damp leather or sackcloth, duty compelled him to lie prone on the floor and light the gas suspended in the air above him. If he survived the explosion he returned to the surface and reported the mine safe. Another method of disposing of gas was the use of "eternal lamps," kept burning continuously in gaseous mines to burn the gas as fast as it was generated.

Recent consular reports show that during the year 1910, the output of coal in the United Kingdom was 264,417,588 long tons, an increase of 658,216 long tons over 1909. This came from 3253 mines, where 1,049,407 persons were employed. It is interesting to note that of this number 6221 were women, and 72,094 were under 16 years of age. The total number of deaths from accidents during 1910 is the highest ever recorded, being 1775, or 169 deaths for every 100,000 people employed. The injured in accidents numbered 159,042, which amounts to 151 out of every 1000 people employed or over 15 per cent. The annual output of coal per worker has also been estimated as follows for various countries: United States, 500 to 600 tons; Great Britain, 250 to 290 tons; Germany, 250 tons; France, 200 tons; Belgium, 170 tons; Australia, 490 tons; Canada, 425 tons; Japan, 120 tons.

DISCUSSION by READERS

Comment, Criticism and Debate upon Previous Articles, and Suggestions from the Experience of Practical Men

Opening a Colliery

In your issue of Oct. 28, p. 92, you answer a question, "Opening a Colliery." Allow me to suggest another way to open this colliery under the conditions named. I would sink the main-haulage slope in the Buck-Mountain vein instead of in the Mammoth, for the following reasons: The Buck-Mountain is an underlying vein and the upper or overlying veins could then be mined and robbed without injuring the lowest seam. Also the Buck-Mountain vein has the least pitch, and if it is found to be more advantageous the cars could be hoisted to the surface in this vein, with less danger of the coal falling off while hoisting.

A tunnel should be driven from the bottom of the slope in the Buck-Mountain to the Mammoth and this vein, the Mammoth, worked first. As these workings advance the Skidmore vein should be developed and then the Buck-Mountain. This would give a more equalized cost than to work the Mammoth vein alone. The pumping station should be located in the Buck-Mountain vein, as no coal would then have to be reserved to protect it. I would locate the fan on the Buck-Mountain vein and drive a main air-tunnel from the Buck-Mountain vein to the Mammoth and take splits off each of those veins. I would use a blowing fan and drive openings in each vein to the surface for return air courses. This arrangement would be more economical, as it would not be necessary to maintain long return airways.

There are numerous reasons in my opinion why this plan is preferable, but I would be pleased to have some other subscribers give their views on the question, or I shall be pleased to have you criticize my plan.

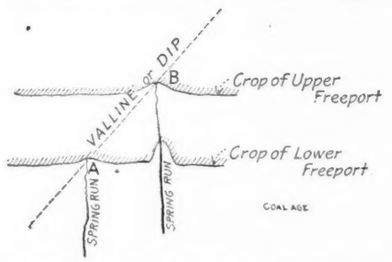
A SUBSCRIBER

Mount Carmel, Penn., Nov. 6, 1911

[We are glad to receive these valuable comments from our correspondent. There may be some difference of opinion in regard to the best method to be adopted in opening a colliery on these seams; but our correspondent's points are well taken. They are particularly applicable in case the parting between the seams is of insufficient strength to maintain a safe and economical condition of the main-haulage slope. In any case, mining should commence and advance more rapidly in the upper seams, the workings in the underlying seams following some yards behind those above. It is also necessary to provide ample protection for all slopes and air courses by leaving sufficient slope pillars in each seam. These slopes and pillars must lie vertically under each other in the several seams.—EDITOR.]

Surface Evidence of a Dip

On the development of a drift opening in central Pennsylvania, in the lower Freeport bed, I noted on the surface that two spring runs descended the hill, crossing its contours at right angles.



TWO RUNS ISSUE WHERE CROPS AND DIP CROSS

One came obviously from the crop of the lower Freeport at *A*, another from the crop of the upper at *B*. The natural assumption was, granting that both measures were similarly folded, that a dip or valline extended in the lower Freeport from *A* to *B*, and for some distance beyond. This dip was found when the drift was opened. The presumption that a dip ran from *A* to *B* was very clear, owing to the short distance between the runs, but with caution the method might be extended with advantage to greater distances, especially where the roof of the lower measure is heavily eroded and the upper measure does not crop near it.

Pittsburg, Penn. H. A. B.

Records for Mine Output

What is probably a Yorkshire record in coal mining, if not a world's record, has been achieved at the Hickleton Main Colliery. Recently the tonnage raised during six days reached a total of 26,986 tons, from a seam which is known as the Barnsley bed. Another record for the week ending Oct. 24 is 25,572 tons from the Crown Farm Pit of the Bolsover Colliery Company. This amount was mined in the time of five days and a half, each of 7 hours and 5 min. duration, only one shift per day being worked. It is said that this latter mine holds the world's record for a day's output, which is 4678 tons of coal.

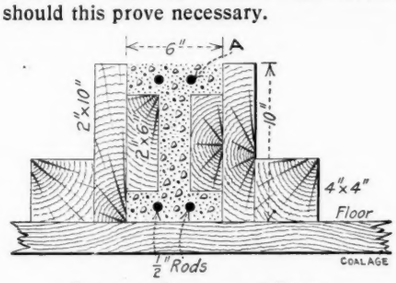
Wigan, Eng. T. J. HEILMAN.

A Homemade Concrete Timber

On an unusually broad parting, or in an exceptionally bad piece of ground, occasions frequently arise where a timber of more than ordinary strength becomes necessary. To meet such an emergency the foreman makes a special order for large-dimension stuff, uses a built-up girder (made of a number of boards nailed together) or falls back on that old standby, the T-rail, with its notoriously uneconomical section.

While no data in regards to costs are available, it is believed that the method here described will not exceed these rather expensive subterfuges in cost, and there can be no question as to its superiority.

The method of construction is clearly shown in the accompanying figure, which is a cross-section through the beam and form. The beam here described is 10 in. deep, 6 in. wide and has a 2-in. web; all dimensions can be easily changed to suit conditions, the ones here shown no doubt being smaller than would be used in practice. As will be noted in the drawing, the form is simply two 2x10 in. boards, with a 2x6 nailed on their respective inside faces. The 2x10's are spiked to the floor on edge, at the required distance apart, and for the sake of additional rigidity, backed with blocks, should this prove necessary.



SECTION CONCRETE I-BEAM

By the use of reinforcement the strength of the beam can be appreciably increased. Thus in the section shown, two ½-in. rods are used, which at the ends of the beam should be near the top of the section as shown at *A*, and gradually lower, until at the middle, they are near the bottom.

The concrete should be a good rich mixture of about 1:2:4 and not to exceed 1:3:5, and made soft to insure its running well. The large aggregate should be sized to pass a 1-in. ring and for beams smaller than this it may prove desirable to decrease this even more.

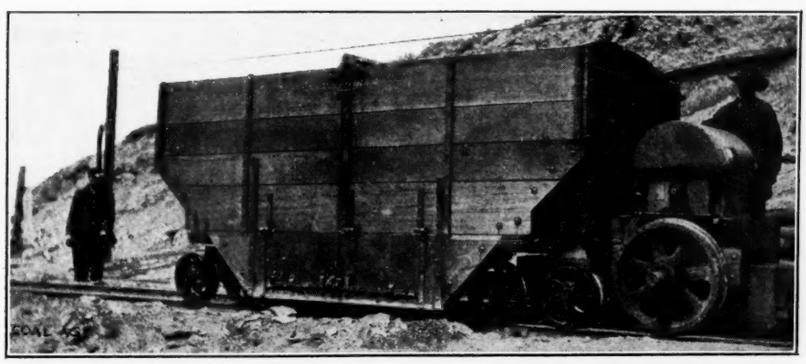
The size and shape of the beam can, of course, be varied to suit the requirements of the case, but it should be remembered that the strength varies (approximately) directly as the square of the depth. Thus the comparative strength of an 8-in. and a 10-in. beam would be 64:100, or the 8-in. only about three-fifths as strong as the 10-inch.

Better results will be obtained by rounding the corners slightly and filling in angles with small shapes. A more nearly true I-beam is thus obtained, and sharp corners, which are easily broken, thus eliminated.

New York. A. T. S.

Boiler Fuel Larry for a Mine Boiler Plant

Few coal-mine tipples are now built without making special provision for taking slack coal directly from the tipple into the mine boiler plant. The usual method is to install a small scraper conveyer, which runs while the screens are running and receives coal through a small opening in the flat screen. This makes a simple and inexpensive apparatus.



SIDE DUMP LARRY FOR BOILER FUEL, AND ELECTRIC MOTOR

However, sometimes the power house is situated so far from the tipple that it is not possible to use a conveyer. At the plant of the Central Coal and Coke Company, at Sweetwater, Wyo., the boiler house is about 400 ft. from the tipple and the lay of the ground is such that a conveyer could not be installed. For many years coal was hauled by team up a 5 or 6 per cent. dirt road. Inasmuch as this plant furnishes power to several mines and is consequently of considerable size, it was necessary to employ a team and a man six days a week to supply sufficient fuel.

Having on hand some old electric-locomotive motors, the superintendent built a side-dump larry car, capable of carrying about eight tons of slack, and coupled it through a draw bar to one of these motors, still mounted on the same wheels and axle formerly used in the locomotive.

This rig, shown in the illustration, has given satisfactory service, and the coal supply is now brought by it to the boilers in an hour each day. The team and driver have been taken from this work, and the tipple boss finds time enough to handle the electric larry in addition to his other duties.

An amusing controversy arose as to why the larry developed a greater draw-bar pull when running in one direction than when running in the other. Of course, it is obvious, after consideration, that since the motor is mounted on only one pair of wheels, when it is running in one direction and pushing the larry, the tendency of the downward thrust of the draw-bar is to force the motor wheels against the track, thus giving a greater tractive force, while when running in the other direction, and pulling the larry, this condition does not obtain.

BENEDICT SHUBART.

Denver, Colo.

Fan Doors

The explosion door on a fan should not be too readily opened. There is no use in designing it so that it will open for a pressure measured by a few inches of water gage, less than five or six, for instance. A well built fan will not break, especially if run at a high speed at such a low water gage. A door which opens too easily is apt to be wrenched off its hinges, if exposed to a pressure greater than it is designed to oppose. It is better to use a door than to house the downcast with a wood or weak concrete roof without a door. The resistance of such a roof to pressure is indeterminate; besides, such a covering takes too long to replace by boards. Nevertheless it does seem well to arrange the whole covering of the downcast so that a particularly violent explosion will find nothing really solid to oppose its escape in all directions except the fan itself. There has been a disposition to design fan doors and fan-release housings with certain types of explosion in view. It is true that in some places explosions are usually made more violent by reason of the presence of coal dust. It is quite possible that with the care which is now being taken to prevent unsafe coal-dust accumulations, explosions may be, in those localities, less violent in the future, and it may be well to consider the question as to whether it would not be better to provide fan doors rather than such housings as would only open as a result of a more violent explosion.

Birmingham, Ala. F. R. B.

Byproducts of Coke

It would be impossible to estimate even approximately the waste incident to mining and using coal in its various forms. Every year, however, we are making some progress toward more economy and some day we will perhaps be realizing greater profit from what is now going to waste than we have obtained in the past from the coal product itself.

Different phases of the industry will be worked upon and developed on a more scientific basis. One of these that has already received attention is the saving of byproducts in coke manufacture.

It is pointed out that hundreds of millions of dollars worth of what may in the future prove valuable byproducts have been wasted in the past by American people and that in this respect the United States is far behind Germany and other foreign countries in adopting the economies resulting from the coking of coal in byproduct ovens.

The first ovens of the byproduct type in the United States were built in 1893 at Syracuse, N. Y. In 1910 there were 4078 byproduct coke ovens, and all of them were in active operation. The greater part of these have been developed, during the past few years. In fact, the greatest activity seems to have been during 1909 and 1910.

VALUE AND AMOUNT OF BYPRODUCTS

The production of coke in byproduct ovens during 1910 amounted to 7,138,734 tons, which was about 12.17 per cent. of the total production.

The total value of the byproducts obtained from the manufacture of coke in retort ovens in 1910 was $8,479,555, or a little more than one-third of the value of coke produced. This is the thing the industry needs to keep its eye on, the value of the byproduct and the possibility of making it nearly, if not equal to the original product.

It may develop in the course of a few years that we will have in the byproducts of the coal industry a somewhat parallel case with that of the cotton seed, the byproduct of the cotton fields in the South. There was a time when cotton seed was a burden to both the planter and the ginner and was an expensive product to dispose of. Today it is the basis of a large industry and really gets more attention than the cotton product itself.

Louisville, Ky. J. C. T.

INQUIRIES of GENERAL INTEREST

A Page Devoted to Those who want Information. All Questions must be Accompanied by the Name and Address of Inquirer

Fan Ventilation

Ques.—If a mine fan 12 ft. in diameter has an equivalent orifice of 30 sq.ft., and the orifice of the mine is 19 sq.ft.; what is the manometrical efficiency of the fan? What quantity of air will this fan deliver under the conditions given?

H. M. M.

Puritan, Penn.

Ans.—By manometrical efficiency is meant the percentage of useful effect (pressure) produced by the action of the fan; in other words, the ratio of the mine pressure in the fan-drift, to the total theoretical pressure developed in the fan. When the orifices of the mine and the fan are both given, as in this case, mine orifice = 19 sq.ft., and fan orifice = 30 sq.ft., the manometrical efficiency K is best calculated as follows:

$$K = \frac{30^2}{30^2 + 19^2} \times 100 = 71.37\%.$$

Also, from the same data, knowing the diameter (12 ft.) and the speed of the fan (90 r.p.m.), the quantity of air the fan will deliver is found thus,

$$Q = 2.916 \frac{30 \times 19}{\sqrt{30^2 + 19^2}} \times 12 \times 90;$$

$$Q = 50{,}550 \text{ } cu.ft. \text{ } per \text{ } min.$$

The mine gage, in this case, is

$$i = \left(0.00038 \frac{50{,}550}{19}\right)^2 = 1.022 + inches.$$

Storage of Bituminous Coal

Kindly give me references concerning the storage of bituminous coal. I desire to know what conditions of coal and storage may result in spontaneous combustion occurring in the coal, and how this may be avoided; also, how to handle a fire started in a large quantity of stored coal. I shall be glad to see such matters treated in your columns, giving examples of current practice and the difficulties met.

H. D. EASTON.

Lexington, Ky.

The subject of the storage of coal, both anthracite and bituminous, has been growing rapidly in importance during the past few years of increasing industrial activities supplemented by labor troubles that have necessitated the maintenance of large supplies of fuel by the government, transportation companies, manufacturers and all consumers of coal.

The storage of anthracite coal is mostly a question of the economical handling of the coal, as with ordinary precaution and care there is little fear of spontaneous combustion taking place, except where the coal contains much sulphur and is stored in damp or poorly ventilated quarters.

Bituminous coal, on the other hand, gives much trouble in storage, as it fires readily from spontaneous combustion; and, not only this, but the coal slacks or breaks up and there is a large loss on this account and owing also to the evaporation of the water contained in the coal.

The best reference, to our knowledge, is to be found in Bulletin No. 46, published by the University of Illinois, December 19, 1910, entitled, "The Spontaneous Combustion Of Coal," and giving the results of the investigations made along this line by the staff of the Engineering Experiment Station of the University. The bulletin recites the experience of the Chicago & Alton Railroad Company in the storage of run-of-mine coal from mines of the Springfield district, Illinois.

The Illinois coal, in common with all the coals of the central valley, contains a high percentage of moisture which averages from 12 to 15 per cent. and a relatively large amount of oxygen combined as part of the organic matter of the coal. The evaporation of this moisture, together with the natural structure and cleavage of these coals, causes them to slack readily when exposed to air. This action constantly exposes fresh surfaces to the action of the air and increases the absorption of oxygen, which leads to oxidation, the generation of heat, and finally spontaneous combustion. The high percentage of volatile matter, which is the chief characteristic of bituminous coal, makes it susceptible to spontaneous ignition where anthracite coal, of greater density and containing less volatile matter and a high percentage of fixed carbon would not be affected.

When necessary to store bituminous coal, it should be carefully piled to avoid unnecessary breakage of the coal. The piles should not exceed 6 feet in hight and should be protected from rain and snow by an open shed. The ground should be well drained or there should be a cement floor. The piles may be of any desired length, but the width should not exceed four times the hight of the pile.

The Western Electric Company, in 1902, experimented on the storage of Illinois coal in large quantities under water, at their Polk-Street plant. The results of this trial were so satisfactory that the same company, later, built a large storage pit of concrete, at their new Hawthorne plant. This pit was in three sections, 15 feet deep, and covering an area of nearly an acre; its capacity was 10,000 tons of coal, which could be all covered with water. The sections were crossed by three tracks supported on concrete arches and a track on each side, making five tracks in all from which coal could be unloaded or loaded. The reloading of the coal from the pit was accomplished by a crane mounted on a truck and provided with a huge grab-bucket.

Coal thus stored under water does not require to undergo any drying process. The loss in calorific power or heat value, after being stored twelve months under water, has been found, in certain cases, to be less than 3 per cent.; while the same loss in the case of such coal stored in the open air would range from 10 to 15 and at times reach 20 per cent. A description of the Coal-Storage Under Water, at Hawthorne, Illinois, is found in the ENGINEERING AND MINING JOURNAL, March 23, 1907, page 576.

The Oxidation of Coal

Does coal absorb oxygen from the air, at all temperatures, and what is the effect on the coal? In other words, does oxidation always take place in the coal, or is the oxygen simply absorbed and held in the pores of the coal in the same manner as the coal absorbs and holds moisture?

CHEMICAL ENGINEER

This question has been the subject of recent investigation by the Engineering Experiment Station of the University of Illinois, at Urbana, and some interesting and important conclusions may be found in Bulletin No. 46 of the University of Illinois, page 50.

In answer to the above questions, it may be stated, on this authority, that there appear to be two classes of oxidation that may take place in bituminous coals of the Illinois type, which contain a comparatively high percentage of moisture, generally above 10 per cent.; and are likewise rich in oxygen combined as part of the organic matter of the coal. The initial oxidation, which is not destructive to the coal and produces no carbon dioxide, but rather a change in certain unsaturated compounds of the coal, takes place continuously at temperatures below, say 300 deg. F. At about this point destructive oxidation begins with the production of carbon dioxide.

EXAMINATION QUESTIONS and ANSWERS

To Encourage, Assist, and Instruct Those Preparing for Firebosses, Mine Foremen, and Inspectors Examinations. Selected and Original Questions Are Carefully Answered And Fully Explained

Interesting Questions

Splitting the Air Current

Ques.—What method of ventilation lessens the danger of an explosion and, at the same time, reduces friction?

Ans.—Splitting the air current in a mine provides purer air at the face of each district or section of the mine. The gases generated in each district are carried at once into the main-return airway by which they are conducted out of the mine. In this method of ventilation, the chances of ignition of gas are reduced to a minimum, as far as the circulation is concerned. Moreover, should gas be ignited, causing a slight explosion, the trouble will usually be confined to the single district in which it occurred. When the main air current in a mine is divided into two or more separate splits or currents the velocity of the air sweeping the working face is much reduced. This not only reduces the friction of the air current, but exposes the workmen often to less discomfort, arising from too strong a wind, and reduces the danger of the flame of the lamps being blown through the gauze.

Relative Diameter and Length of Post Timber

Ques.—Is there any rule that will apply, in general, to post timber in mines, by which the proper diameter of a post may be determined for any given length?

Ans.—The practical question relating to size of posts, in mine timbering, is to determine the minimum diameter, or diameter of small end of a post, such that the post will have equal tendency to crush or bend. It is evident that a long, slim post may bend before the pressure exerted is sufficient to crush the fibers. On the other hand, a short, thick post will probably crush under a weight that is insufficient to cause bending. It can be shown that, for practically all kinds of mine timber, the tendencies to crushing and bending are about equal when the ratio of the diameter of the small end of the post to its length is 1:12. This gives the following practical

Rule: *To secure the greatest efficiency and economy, in post timbering, make the smallest diameter of the post, in inches, equal to its length, in feet.* Thus, the least diameter of a 6-foot post should be about 6 inches; that of an 8-foot post, 8 inches, etc.

This rule assumes a good and uniform quality of timber, free from knots that would seriously impair the strength of the timber. The ends of the post are also assumed to be squared. Due allowance should be made where the timber does not fulfill these conditions.

Glen Jean, W. Va., Examination

Proper Use of Explosives

Ques. J—(a) What does the law require with regard to the use of explosives in mines? (b) What dangers are likely to arise from the use of explosives in blasting coal or rock in mines, and what precautions should be used to minimize those dangers?

Ans.—(a) The precautions to be incorporated in the mine rules and to be rigidly enforced are:

(1). Take no more powder into the mine than is required for the work of one shift, and what is taken in must be in 5-lb. canisters.

(2). Use clay for tamping, or stemming.

(3). The powder, in any hole, should not occupy more than one-third of the length of the hole.

(4). All coal should be undermined before blasting.

(5). When making a cartridge the miner should put his lamp at a distance of at least 5 ft. from the powder.

(6). In tamping a hole, a copper-tipped tamping bar and a copper needle should be used.

(7). No more than one blast should be fired at one time, and the miner must give warning to the other workmen when he is ready to shoot.

(8). The miner must wait until the smoke from a blast has cleared out of his place before returning to work therein.

(9). Blasting is strictly prohibited in a place where gas may be detected by an approved safety lamp.

(10). All dry and dusty places must be thoroughly watered for a distance of 60 ft. from the face before blasting is permitted.

(b) Careless handling of explosives, using slack coal instead of clay for tamping, putting in too large a charge of powder, and shooting from the solid any of these may be the initial cause of an explosion of either local or general character. Then there is the possibility of the premature explosion of the charge, either when the cartridge is being made or when it is being tamped. Accidents sometimes happen to men who walk up to blasts without having been warned, and when more than one shot is fired at a time, the miner is likely to be mistaken as to the number that explode and be injured or killed instantly by a delayed blast. The practice of firing more than one shot at a time is not approved in this State.

Again, a blast at the face of a room may knock out posts and weaken a dangerous top.

Blasting in the presence of explosive gas, or in a place that is dry and dusty, is a dangerous practice.

If too large a charge of powder is used, if the hole is loosely tamped or stemmed with fine slack, or if a blast is fired in an improperly placed hole, there may result an explosion of the fine coal dust suspended in the mine air. In such cases, the flame from the shot extends into the mine atmosphere and heats the suspended particles of coal dust to incandescence. These particles transmit heat to others, which also ignite, and all of them evolve gas that is inflammable.

The following precautions are suggested as supplemental to those mentioned above. The shooting of the center shot first, following it by shots near the rib, is to be preferred. There is plenty of opportunity for a center shot to do its work with a maximum of certainty. When the center coal is broken down, the two side shots (being loose below in the undercutting and loose on one side where the center coal has been shot out) shoot easily. Thus there are no hard shots to make. In some cases vertical shearing, usually by machine, is used as a supplement to undercutting, thus heavy blasting is rendered unnecessary. With the adoption of any of these methods there is less danger of dust ignition from heavy shooting.

The use of a copper needle and a copper-tipped tamping bar is to be strongly urged and is demanded by law. When a needle is of iron it is liable to strike fire as the hole is tamped. It must be remembered that the needle may move in the auger hole if the hole is not drilled perfectly true, and its point may be in contact with an "iron" ball or nodule. On being suddenly jerked by the action of the tamping bar, the needle may "strike fire." Similarly, as the tamping bar moves forward it may strike an offset in the hole and sparks may be generated, which will ignite the powder prematurely.

SOCIOLOGICAL DEPARTMENT

A Bureau Devoted to the Welfare of Miners Everywhere, and Especially Designed for the Betterment of Living Conditions In Mining Communities—COAL AGE will be Glad to Print Any Suggestions or Ideas of Value to this Department

Liquor Problem in Mining Communities

By C. L. Fay

The Donahoe Coke Company has taken up a comprehensive scheme of welfare work at its mines in Crabtree, Westmoreland county, Penn., included in which is a method for reducing the excessive consumption of liquor. To show, however, that the company's improvements are not merely attempts to control the indulgences of their employees I quote C. Rae King, the superintendent of the mines and the originator of the Greenwald Welfare Plan.

C. Rae King on Welfare Work

He says, "When four- to six-roomed cottages can be built for about the same price per room as the standard eight-room, two-decker-double-red-painted houses, there is no excuse for the tenement-like conditions that exist in the average mining town." Mr. King adds, "Get a good class of men and at the time you employ them make a record of their nationality, whether married or single, their citizenship, religious faith, occupation in the old country and America. Supplement this with a similar census of old employees, including also the number of boarders in each house and you will have a valuable record when it comes to carrying out a definite welfare plan." To quote further, "Provide employees and their families with warm, single houses, encourage them to fix up and clean up, furnish fruit trees and flowers for the yards and control the drink traffic and you will not only assist in developing the character of the young Americans to-be, but you will secure a great increase in the efficiency of your *human machinery* with consequent financial saving to the industry and in part liquidate the obligation you owe to your fellow man and your God."

From these statements of Mr. King it is noticeable that while he is dealing with the liquor problem from the economic standpoint he is, nevertheless, prompted by motives deeper and nobler than those of the mercenary schemer and this will hold true in the cases of all individuals or industries that successfully cope with the problem.

However, the more unique feature of the welfare work of the Donahoe Coke Company is its Greenwald Welfare Committee with its activities in reducing the disposition to indulge in liquor drinking and inebriety. The purposes and aims of this committee as set forth in its code of rules are given below.

Greenwald Welfare Committee—Rules and Regulations

First. The objects of the Greenwald Welfare Committee are to control and minimize the distribution of intoxicating liquors among the workmen of the Donohoe mines; to aid and assist the needy and unfortunate; and to bring about such improvements in the living conditions and general welfare of the community as will appeal to the better class of foreign workmen.

Donahoe Coke Company Mach'ne Shop, Showing Charts That Are Posted Weekly

In order to secure the greatest results in the shortest possible time, the Committee asks that all workmen who desire to make this a clean and law-abiding community in which they can permanently settle and rear their families, cooperate and assist in the removal of the antagonistic and undesirable citizens and workmen.

Second. The officers shall consist of a president, secretary, treasurer and peace officer, and shall be appointed by the superintendent of the Donohoe Coke Company and shall hold office during the pleasure of the superintendent. The offices of secretary and treasurer may be held by one person.

Third. Only one agent of the various breweries and distilleries hereinafter named shall be permitted to solicit orders for beer or whisky upon and about the lands of the Donohoe Coke Company.

Fourth. The said beer and whisky agent shall pay over to the treasurer of the Welfare Committee, for the use of the committee, all moneys and compensation received by him for his services in the soliciting and sale of beer or whisky in excess of the sum of per week, and all such sums so paid as aforesaid shall be devoted to charity work, in accordance with the objects of this committee.

Fifth. Each week a statement will be posted showing in detail the placements of beer and whisky for that week and the amount of money turned into the treasury by the agent; the books of the committee shall at all times be open for the inspection of the public and officers and workmen of the Coke company; and semi-annually a statement will be posted showing the distribution of charity funds.

Sixth. The agent shall explain fully to the workmen the intent and purpose of this movement; he shall comply in every respect with all laws and court rulings as to the sale of beer and whisky.

Seventh. The value of an agent will be determined by the extent to which he is able to reduce the consumption of liquors and beer without causing dissatisfaction among the workmen. He shall show no favors to any particular company for whom he acts as agent; and a reward of $25 is offered for satisfactory proof of the agent's having wilfully favored any brewery or distillery, which $25 shall be paid by the agent.

Eighth. Unless otherwise directed by the secretary of the committee, the agent is to solicit orders only on Tuesday morning of each week and to deliver on Saturday of each week, unless holidays or election days disturb this arrangement, in which case the agent shall call the same to the attention of the secretary in ample time for other plans to be made.

Ninth. The agent is to report and transact all business, relative to orders, with the secretary no later than Wednesday morning of each week.

Tenth. The agent shall gather up empties on Monday of each week, and he shall be responsible for each and every keg or case lost; in the event he reports the party losing the same, the president of the committee will assist in recoveries.

Eleventh. A copy of all orders shall be left by the agent with the secretary.

Twelfth. Until further advised the agent is to solicit as follows:

*Secretary, Coal Mining Institute of America, Wilkes-Barre, Penn.

Note—This is the fifth article discussing the above subject.

Red whisky, $2.25, $2.50, $3, $3.50, $4; bottled in bond, $1.25 per quart. White whisky, $2.50, $3 per gal. Wines, etc., $1.50, $2, $2.50, $3, $4. Rum, gin, brandy, *et al.*, $2.50, $3, $3.50 per gal. Can sell as small a quantity as quarts. (.....) Distillery: Can sell no less than gallon lots. Prices: $2, $2.25, $2.50, $3, $3.50, $4 per gallon.

Thirteen. The said agent shall act as such for the following breweries only: (.....), (.....), (.....).

Fourteenth. Brewers, distillers and other persons interested may send a representative around at any time with the agent while he is taking orders, to ascertain if any influence is being exerted by the agent to cause workmen to buy beer or liquor from any particular company.

Fifteenth. No more than five kegs of beer shall be delivered to any one house in one week unless the occupant of said house obtains an order from the superintendent's office for more; and the agent shall report anyone loaning or giving kegs of beer to another.

Sixteenth. Before transacting any business the agent shall be registered in the clerk of court's office of Westmoreland county, as the agent of the breweries and distilleries by which he is employed, stating the particular territory in which he works, as required by the rule of court.

Seventeenth. Said agent shall act as the *bona fide* agent of the breweries and distilleries employing him; he shall not buy the liquors from the breweries or distilleries and then sell to the customers; the goods must be set apart for the purchaser at the brewery or distillery; the agent shall invariably take the order from the customer in writing and at the time of taking the order he shall inquire of the customer what brewing or distilling company said customer desires to purchase from, and the agent shall take the written order accordingly.

Eighteenth. The dealer can sell only at one place, namely, at the place named in his application for license, and orders received by him for the goods must be filled at that place and title must pass from the dealer to the purchaser then and there. The goods, which then belong to the purchaser, can be taken away by the purchaser himself, or can be delivered to him in the county by the dealer in marked wagons, or can be delivered by the dealer to a common carrier to be shipped to the purchaser; but no device by which the delivery is made, which passes title at any other point than the place licensed, will be tolerated.

Liquor Drinking Reduced

The work of the committee is but partially comprehended in the printed rules. The Donahoe company considered it best not to print the details of the welfare plan in their entirety, but by encouragement and thoughtful leadership to endeavor to inspire the mine employees gradually to develop and request coöperation in the securing of the conditions and privileges which the officials of the company had, in thought, already anticipated.

Mr. Donahoe, in paying a tribute to Mr. King, said: "His plan not only comprehends the philosophy of the survival of the fittest, but it also aims to make the unfit *fit*."

This plan has been in operation since December, 1908.

Before the Welfare Committee started its operations the average consumption of beer at Crabtree was as follows:

Before Control of Traffic

Week ending	
Oct. 3, 1908	880 gal. beer
Oct. 10,	688 gal. beer
Oct. 17,	744 gal. beer
Dec. 5,	564 gal. beer
Dec. 12,	412 gal. beer
Dec. 19,	1188 gal. beer

while under the control of the Welfare Committee there was a decrease as indicated by figures taken from a few of the weekly reports:

After Control

Week ending	
Dec. 26, 1908	396 gal. beer
Mar. 6, 1909	368 gal. beer
Mar. 13,	276 gal. beer
Mar. 20,	340 gal. beer
June 12,	460 gal. beer
June 19,	468 gal. beer
June 26,	412 gal. beer
Aug. 19, 1911	380 gal. beer

When this plan was inaugurated at Crabtree, the company had the usual red-painted double houses and "shacks" to rent to employees. The streets were not graded. The yards were filled with mud, rock, tin cans and beer kegs. There were no gardens, fruit trees or flowers. Some of the miners owned half-starved cows, which were not kept and milked under sanitary conditions. Drunkenness, fighting and disorder were as much in evidence as in similar mining towns.

Chart No. 1 shown below, indicates the purchase of beer and whisky made at each house and shanty under the Greenwald Welfare Plan, Chart No. 2, which follows, exhibits the accrued profits, and the disposal which has been made of them. On page 222 is a view of the

CHART NO. 1. COPY OF WEEKLY REPORT OF THE GREENWALD WELFARE COMMITTEE—Week Ending Aug. 19, 1911

House	Boarder	Beer	Whisky	House	Boarder	Beer	Whisky	House	Boarder	Beer	Whisky	Shanty	Boarder	Beer	Whisky
1		O.K.		26	6	3	½	51	11	7	½	101		O.K.	
2		O.K.		27		1		52	O.K.			102		O.K.	
3		O.K.		28		2		53	O.K.	1		103		O.K.	
4		O.K.		29		O.K.		54	1			104		O.K.	
5		O.K.		30	3	1		55	O.K.	6	1½	105		O.K.	
6		1		31	1	O.K.		56	1	1		106		O.K.	
7½	3	1		32		O.K.		57	O.K.		½	107		O.K.	
7	1	2		33	2	O.K.		58	O.K.	1		108		O.K.	
8	1	1		34		O.K.		59	4	1	½	109		1	
9		12	½	35		O.K.		60	O.K.			110		O.K.	
10	8	10		36		O.K.		61	O.K.			111		O.K.	
11	1	O.K.		37		1		62	O.K.			112		O.K.	
12		1	1	38		O.K.		63	O.K.			113		Empty	
13	9	3		39		1		64	2	1		114		Empty	
14		O.K.		40		1		65	3			115		Empty	
15	1	O.K.		41		O.K.		66	O.K.	1		116		Empty	
16	1	O.K.		42		O.K.		67	1			117		Empty	
17	2	O.K.		43		O.K.		68	O.K.	1		118		Empty	
18		O.K.		44	5	3		69	2	1		119		Empty	
19		O.K.		45	2	5	1	70	O.K.			120		Empty	
20	4	1		46		1	½	71	O.K.	1	½	121		Torndo'n	
21	6	3	½	47	7	5	1	72	4	1	½	122		Torndo'n	
22	2	2		48	3	1	1	73	O.K.	1		123		Torndo'n	
23		2	½	49	3	1	1	74	5	2		124		Torndo'n	
24		O.K.		50	7	2	½	75	2	1		125		Torndo'n	
25		O.K.	½												
	39	39	3		39	28	5½		36	27	4			1	

Sales for the week ending August 19, 1911.

95 kegs and cases beer at $1.00, total	$ 95.00
12½ gallons whisky and wine, total	34.00
Sales for the week	$129.00

Note.—O.K. means, no liquor sold.

Expenses for the week ending August 19, 1911.

Agent S. Haraintz, self allowance for the week	$ 7.50
Postage and stationery	0.15
Sundries	
Total expenses	$ 7.65

Income for the week ending August 19, 1911.

95 empty kegs and cases at 25 cents, total	$ 23.75
12½ gallons whisky and wine, $34.00, profit	7.91
Income for the week	$ 31.66
Expenses for the week	7.65
Balance paid into charity fund	$ 24.01

J. J. JOYCE, Sec'y and Treas.

blacksmith shop where chart No. 1, signed by the secretary, is exhibited weekly. Thus every detail of the plan can be followed by all who are interested.

CHART NO. 2

GREENWALD, PENN., June 1, 1911

THE FIFTH SEMI-ANNUAL STATEMENT OF THE GREENWALD WELFARE COMMITTEE FROM DEC. 1, 1910, TO JUNE 1, 1911

Donated by brewers' and distillers' agent for charity		$750.99
Fines for trespass, etc., returned by A. C. Books		3.37
Total amount contributed		$754.36
Expenses for the six months from Dec. 1 to June 1:		
Lumber for new ice house	$305.51	
Carpenters putting up ice house	80.81	
Hauling sawdust, ashes, etc., for new ice house	33.44	
Labor putting up ice	61.50	
Refreshments for men putting up ice	6.00	
Total expenses for six months		$406.45
Balance available for charity		$347.91
Amount available for charity as per Dec. 1 statement		1050.25
Total amount for charity purposes		$1398.16
Amount contributed for charity from Dec. 1, 1910, to June 1, 1911:		
Tony Cashmere, hospital service	$ 7.00	
Tony Cashmere, Dr. Bailey for service	11.50	
Mike Watchio, Dr. Eberhart for service	4.00	
John Smith	15.00	
John Marone, lost his life in mine, paid his mother in Italy	100.00	
Amount contributed for charity from Dec. 1 to June 1, 1911		$137.50
Total amount for charity purposes, June 1, 1911		$1260.66

.....Sect. & Treas.

FIFTH SEMI-ANNUAL REPORT OF THE BREWERS' AND DISTILLERS' AGENT

GREENWALD, PENN., June 1, 1911.

1842	½-bbl. beer, delivered @ $1.00	$1842.00
40	½-bbl. beer, delivered @ $2.00	80.00
699	cases beer, delivered @ $1.00	699.00
502¼	gal. whisky, delivered	1437.00
Total cash received by brewers' agent from Dec. 1, 1910, to July 1, 1911.		$4058.00
Empty packages returned to brewers on which agent's salary is based:		
1745	½ bbl.	$436.25
36	¼ bbl.	18.00
632	cases	158.00
Distillers pay whisky agent on 20 and 25 per cent. of sales:		
499¾	gal. whisky and wines, $1410.25, 20 per cent	282.05
9½	gal. whisky and wines, $26.75, 25 per cent	6.69
Total amount retained by agent for 6 months		$ 900.99
Agent's expenses for six months from Dec. 1, 1910, to July 1, 1911:		
Delivering beer and whisky		150.00
Balance donated by agent to Greenwald Welfare Committee		$ 750.99

[The sixth and last article by C. L. Fay, which will pertain to the general social well being of the citizens of Crabtree, will be published in the next issue.—EDITOR.]

Sanitation in Coal Villages

The Alabama Coal Operators' Association has engaged the service of Morris Knowles, an expert sanitary engineer, to make a study of the social and sanitary conditions in the coal regions of Alabama for the purpose of improving the living and laboring conditions of employees. The association includes practically all the coal-mining companies in the district.

Capt. J. V. Allen, secretary of that body, is authority for the statement that the study would cover the water supplied for drinking purposes, sewerage, garbage disposal and the problems relating to education and recreation.

Mr. Knowles will make a systematic inquiry into every mine camp owned by members of the association, and will then make recommendations to the society suggesting what should be done to improve the conditions of the employees. It was announced furthermore that Maurice Roos Scharff, of the Massachusetts Institute of Technology, a sanitary engineer, formerly employed by the New Jersey board of health, would be in the field assisting Mr. Knowles in the accumulation of data required to formulate the report to be made.

The working and living conditions of the workmen of this district have been greatly improved by the methods adopted by the Tennessee Coal, Iron and Railroad Company. However, some of the smaller companies have not possessed sufficient capital to carry on such a work alone. It seems to be the general idea that the course to be pursued in the undertaking will be to apportion the cost to each company, according to whatever possessions it may have. In that way the expense of general reforms will be borne uniformly and they will be carried to completion along the best possible lines with comparatively small cost to each operator.

BETTER MINERS

The work undertaken will bring, it is anticipated, great satisfaction to those workmen in outlying mining towns who are wholly dependent upon the employers for living environments.

It was announced yesterday by Captain Allen that never before in the history of coal operation had an association of mine owners begun such a work with such ideal views and with such a purpose to guide them in the work.

Mr. Knowles, who is to prosecute the inquiry, is an engineer of eminence. He was formerly with the Federal Government and is known here principally through his late connection with the Tennessee company's operations at its lake construction. He has written articles for the Survey, dealing with social conditions in Alabama fields.

First Aid Hints

A primary requisite of any first-aid subject is air. The first impulse of everybody present is to crowd around. Let the experienced come to the front to treat the patient and let all the mere well-wishers stand back and give the patient air and light.

In cases of asphyxiation, be patient in using the stimulus known as artificial breathing. Cases are known where patients who showed no sign of life after an hour of such exercise have yet been brought to life by patient adherence to the prescribed methods of artificial respiration.

A patient who is but slightly affected by gas should be walked around slowly with loosened collar and open shirt. You may give him half a teaspoonful of aromatic spirits of ammonia in a third of a glass of water every 15 min., but not more than four doses. Soda water may be given a person nauseated by gas to lift off his stomach the foul air he has swallowed.

Don't forget the doctor. Don't be so anxious to do the doctor's work that you fail to see that he is sent for. That would be first-aid run to excess. Remember you are only administering preparatory treatment.

In carrying with stretchers break step; take a short pace not exceeding 20 in.; allow no springing from the forepart of the foot. Keep the knees well bent when advancing your foot.

Watch to see that the stretcher is kept level. Don't choose a squad of tall and short men if you can get them all of a size. Unless the patient has a recent fracture of the thigh or rib, take him foot foremost down hill and head foremost up hill.

All three methods of restoring respiration are based on the expansion and compression of the lungs, due to certain artificial actions. Sylvester expands and compresses the lungs by a raising or lowering of the arms. Marshall Hall produces the same effect by laying the patient on his back and rolling him to and fro, so that sometimes he rests on his back, and sometimes on his chest, while Howard keeps his patients steadily in one position, but pushes the flanks of his naked chest together, by an upward motion, releasing the pressure suddenly when the mouths of the kneeling operator and reclining patient come close together. One man can apply Sylvester's method, but at least three are needed to successfully apply that of Marshall Hall.

When a first-aid patient is wounded in the head, see that the canvas of the stretcher does not press on the wound. Use a rolled coat as a pillow and let the uninjured side of the head rest on it. See that the chin is not leaning forward on the breast.

COAL and COKE NEWS

Editorial Correspondence from our own Representatives in Various Important Mining Centers, and a Record of Legislative and Other Action Affecting the Coal Industry

Washington, D. C.

The following appropriations for the next fiscal year have been requested for the Bureau of Mines. The figures given for the current year show the actual current appropriations.

The total appropriation asked for the coming year is $784,800; the total for the current year is $425,000.

GENERAL EXPENSES, BUREAU OF MINES

For the general expenses of the Bureau of Mines, including the pay of the director and the necessary assistants, clerks and other employees in the office at Washington, D. C., and in the field, and for every other expense requisite for and incident to the general work of the Bureau of Mines in Washington, D. C., and in the field, to be expended under the direction of the Secretary of the Interior: For the coming year, $74,300; for the current year, $54,000.

INVESTIGATING MINE ACCIDENTS

For the investigation of the causes of mine explosions, methods of mining, especially in relation to the safety of miners, the appliances best adapted to prevent accidents, the possible improvement of conditions under which mining operations are carried on, the use of explosives and electricity, the prevention of accidents and other inquiries and technological investigations pertinent to the mining industry: For the coming year, $360,000; for the current year, $310,000.

FUEL INVESTIGATIONS

For the analyzing and testing of the coals, lignites, and other mineral-fuel substances belonging to and for the use of the United States: For the coming year, $135,000; for the current year, $100,000.

FOR INVESTIGATIONS INTO THE TREATMENT OF ORES AND OTHER MINERAL SUBSTANCES

For investigation into the treatment of ores and other mineral substances, with special reference to the prevention of waste in the mining, and utilization of important mineral resources: For the coming year, $100,000.

INVESTIGATION OF COALS IN ALASKA

For the investigation of the coals in Alaska with reference to their mining, transportation and utilization, to be immediately available: For the coming year, $50,000.

INSPECTING MINES IN THE TERRITORIES

For the salaries of two mine inspectors, authorized by the Act approved March 3, 1891, for the protection of the lives of miners in the Territories, which states that said inspectors are authorized to inspect coal and other mines in the District of Alaska, to which District the provisions of the Act, except so much as requires six months' residence in a territory prior to appointment, are extended and made applicable; and for per diem, subject to such rules and regulations as the Secretary of the Interior may prescribe, in lieu of subsistence at a rate not exceeding $3 per day each, while absent from their homes on duty, except while in Alaska, and then for actual necessary traveling expenses, including sleeping-car fares: For the coming year, $9500; for current year, $9500.

BOOKS AND PUBLICATIONS

For technical and scientific books and publications: For the coming year, $2000; for the current year, $2000.

BUILDING

Toward the construction of a fireproof building for the experimental work of the Bureau of Mines, the cost not to exceed $200,000. For the coming year, $50,000.

LANDS, LEASES, ETC.

For the purchase or lease of the necessary land where and under such conditions as the Secretary of the Interior may direct, for the headquarters of five mine-rescue cars, and for the construction of the necessary railway sidings on the same, it being provided that the Secretary of the Interior is hereby authorized to accept any suitable land or lands that may be donated for said purpose: For the coming year, $4000.

Alabama

Birmingham—The Bryan Coal corporation has purchased about 1000 acres of coal lands in Walker county comprising the holdings of the Red Star and Eldorado coal companies. Frank Nelson Jr., president of this concern announces that steady development and increased activity will follow.

The Woodward Iron Company has been incorporated with a capital stock of $13,000,000, in Dover, Delaware. It is understood that an issue of $25,000,000 of 5 per cent. bonds will be authorized.

The formal completion of the government mine rescue station was announced Nov. 9 when the State mine inspector, and the various coal companies in the Birmingham district, were informed that the station was ready to answer any and all calls that might be made.

The Alabama Coal Operators' Association has employed Morris Knowles, a well known engineer, and Maurice Scharff, of the Massachusetts Institute of Technology, to study the social and sanitary condition of this district and report a plan for improvements.

Colorado

Meeker—The Lion Cañon coal mine, one of the biggest producers in this locality, has been leased to E. S. Babcock, a well known coal operator, who is making arrangements to operate it on a large scale. Lion Cañon coal compares favorably with the bituminous coal found in Routt county.

Denver—The fourteen union coal miners sentenced to jail on July 14 for contempt of court were released on Nov. 15. The reason given is that the plaintiff, The Northern Coal and Coke Company, having been absorbed by the Rocky Mountain Fuel Company, is not now extant, and is therefore no longer interested in the matter. Judge Whitford's order of release, however, in no wise affects the injunction issued against the men in July, restraining them from interfering with the employees of the various companies in the northern coalfield when a strike is in progress, and from molesting their property.

Illinois

Springfield—The sinking of the shafts of the first of the new mines that are to be put down at Kincaid, midway between Pawnee and Taylorville on the line of the Pawnee railroad, is well under way.

This operation belongs to the Peabody Coal Company, which has extensive holdings in this district and plans to develop them along the most modern lines.

The Jones & Adams coal mine of this city, which claims to hold the State record for the greatest amount of coal mined by solid shooting in one day, has broken its own record. Recently, in eight hours, the men employed in the mine brought to the top 3400.35 tons of coal. Previous to this the shaft held a record of 3017 tons for one day.

Marion—The Burlington is building an extension of about three miles in length

from a point six miles northwest of Marion, to the coal mines adjoining this city. It will connect with the two big Peabody mines and the Chicago-Big Muddy mine.

Indiana

Linton—The Vandalia Coal Company has started mines Nos. 2 and 4, with a force of 150 men each. These mines are located near Linton and have been shut down for three months. Mine No. 2 is the old Island City plant and was the first mine opened in the Linton field.

Lincoln—It is reported that one miner was asphyxiated and 15 were overcome by gas, the morning of Nov. 14 when blackdamp in an entry of the Latham coal mine drove 200 miners from their work.

Oakland City—The Ayrshire Coal Company, owned by the Ingle Investment company, of this city, has begun the work of sinking a shaft for its No. 7 mine, a few miles east of here. The new mine will have a modern tipple of steel construction. Electric haulage will be used and the mine lighted by electricity.

Iowa

Albia—Fire, in the morning of Nov. 11, destroyed a portion of the outside property of the No. 15 Buxton mine of the Consolidated Coal Company. The total loss was about $10,000.

Des Moines—New coal lands are to be developed north of this city, it is said, on a tract of 174 acres, which has been purchased from T. M. Walker by the Claremont Development company for $75,000. It is believed that rich coal deposits underlie the land.

Kentucky

Louisville—The Consolidation Coal Company, building the new city of Jenkins, on Elkhorn creek, in Letcher county, has started another model city on its property across the mountain from the head waters of Elkhorn, on Wright's fork of Boone creek, at the terminus of the extension of the Lexington and Eastern railroad, under construction. The new city has been christened McRoberts, and a post office will shortly be established.

Eighty-five per cent. of the twenty-eight-mile coal road, which has been in process of construction during the past six months from Shelby, Ky., to Elkhorn, is now completed, and it is hoped by spring that the entire line will be finished

The Wilhoit Consolidated Coal Company, Bell county, has filed with the Secretary of State a notice to the effect that the corporation has changed its name to the Wilhoit Coal Company.

The mine of the Majestic Coal Company near Centralia is producing coal in small quantities and as soon as railroad facilities are obtained it is hoped to obtain an output of 500 tons per day.

Barbourville—It is reported that the Black Mountain Coal Company will develop 5000 acres of coal land in Harlan county.

Michigan

Lansing—What is believed to be the largest field of bituminous coal in Michigan has been discovered in a territory comprising 775 acres of land a mile west of Flint. It is said that development of the property by the Genesee Coal Mining Company, which is now operating a mine east of Flint in Burton township, will soon be begun.

Minnesota

Duluth—A total of 810,642 tons of coal, both bituminous and anthracite, was received at the local coal docks during the month of October, according to the records just compiled at the customs offices.

In a recent test made by the Pittsburg Coal Company of its new dock No. 7, the steamer "J. S. Ashley," with 8983 tons of lump coal, was unloaded in 10 hours and 15 min., and the cargo of the "J. E. Upson," 8747 tons of the same grade, was taken out in 10 hours and 55 min., actual working time. This dock has just been completed and is equipped with three bridges of the most modern pattern.

Missouri

St. Louis—It is reported that representatives of the Iowa Central and Minneapolis and St. Louis railroads, have been in the Novinger field inspecting the coal properties there and that they have been negotiating with the owners of the Great Northern Fuel Company and the Manufacturers' Coal and Coke Company with the view of buying their mines.

Ohio

Cleveland—The National Coal Company, of Cleveland, petitioned the Interstate Commerce Commission, Nov. 16, for $30,000 reparation from the Baltimore & Ohio Railroad Company on shipments of coal from Guernsey county, Ohio, during the years 1900 to 1908. It was said that the company went into business in 1900, and owing to the coal-car distribution rules of the railroad suffered great losses, which it now wishes to be made up to it.

Vessels are coming in for at least one or two cargoes of coal at a profitable freight rate before the close of navigation this fall. Some charters were made recently at 50c. a ton, 20c. higher than the rate paid for months.

Bellaire—The Pennsylvania company has required the Rail and River Coal Company to change the position of some of its tipples. They must be set back further from the tracks. Material for the work is on the ground and is being installed as rapidly as possible.

Columbus—With a view to meeting the sentiment among the independent coal operators in Ohio, the railroads which penetrate the coalfields are working on a schedule of freight rates on coal shipments which is expected to satisfy many of the malcontents; but it is not believed the movement is strong enough to influence the coal companies from withdrawing the litigation which is pending in a number of courts. The coal operators are asking for a flat rate of 75c. from the assembling yards at Nelsonville to Toledo, whereas $1 is the present rate.

Pennsylvania

BITUMINOUS

Punxsutawney—At an inquest held by the coroner in the cases of the eight men who were killed by the explosion at the Adrian mine of the Rochester & Pittsburg Coal and Iron Company, it was found that two of the men were killed by the force of the explosion while the other six died later, from carbon-monoxide poisoning. The jury reported that it was unable to determine the cause of the explosion.

Uniontown—It is estimated that at least $100,000 in improvements is being expended by the Rainey company at the Mt. Braddock works, in addition to the amount spent during the past two years in changing the ovens from the beehive to the Mitchell type. The present improvement consists in the erection of a large brick boiler and compressor house, and the instalment of a complete outfit of boilers and air compressors.

Saltsburg—The Penn-Mary Coal Company, of Heilwood, will establish a mine-rescue station, with full equipment. Several crews for first-aid work are being organized.

Du Bois—It is reported that the Buffalo, Rochester & Pittsburg railroad interests are making arrangements for a new opening in this field, about a mile and a half above Jacksonville, on the Rhea farm, where, it is said, a new mining town will be laid out in the near future. Recently this company purchased about 600 acres of the best land in that locality. Other territory in the immediate vicinity has either been purchased or is under option by this company.

Extensive repairs are being made on the company's properties at Ernest and Lucerne, and it is understood that the output of these mines will be increased.

Pittsburg—Col. H. C. Newcomer, of the local United States engineers office has submitted his report on the preliminary examination for the canalization of the Allegheny river, to the chief engineer, Washington, D. C. He recommends the

construction of five additional locks and dams in that river at the present time, which will carry slackwater above the mouth of the Mahoning river.

The Interstate Commerce Commission's hearing on the Pittsburg-Lake coal rate began Nov. 21, at Washington, D. C. It is believed that this hearing is the crucial one in the case and that it will result in a substantial reduction of the 88c. rate. The shippers are making their leading argument a comparison of ton-mile rates, after allowance for terminal expenses, between the Pittsburg district and the competitive districts in Ohio, West Virginia and Kentucky. Even with a large terminal allowance the Pittsburg-to-Lake ton-mile rate is shown to be relatively high.

ANTHRACITE

Scranton—Because of the high price that coal sold for at tidewater during October, the mine workers of the anthracite region will benefit to the extent of an increase of 8 per cent. over the regular rate of wages. Only once before in the history of the award made as a result of the 1902 strike has the sliding scale reached 8 per cent. That was in April, 1906.

One of the most serious caves that has taken place in Scranton for some time occurred on Monday morning, Nov. 20, in Ross avenue. The subsidence engulfed a double frame building and seriously damaged a number of houses in the immediate neighborhood.

The cave is at least 40 ft. wide and 50 ft. deep. The settling began at 5 o'clock in the morning and the house sank into the cave five minutes afterward. The residents had an exceptionally narrow escape. A lamp exploded, setting fire to and completely destroying the building.

The settling was due to the workings of the Von Storch mine of the Delaware & Hudson Coal Company.

The Delaware & Hudson company, according to C. S. Sims, vice-president and general manager, has in the neighborhood of 200,000 tons of coal in storage at Carbondale, Penn., and Schenectady, N. Y. Mr. Sims states that the prospects are that the Delaware & Hudson mines will work uninterruptedly through the winter, not because of the expiration of the contract with the mine workers, but because of the demand for coal.

Wilkes-Barre—A party of men entered the mine of the Pennsylvania Coal Company in the vicinity of Cork Lane, and undertook the task of blowing down a mass of coal and rock without the company's knowledge. The matter is now being investigated. Their object was to protect a certain house which was in danger, should the pillar of coal be removed.

Pennslyvania's production of anthracite coal reached the total of 83,683,994 tons during 1910, according to the annual report of the chief of mines, which has just been issued. This production is the largest in the history of the hard-coal industry, with the exception of 1907, when the tonnage mined aggregated 86,056,412.

The Lehigh Coal and Navigation Company is making experiments with a new type of motor boat, which, if successful, will result in displacing the tow-path mule.

Hazleton—The repairs being made to the company houses at Drifton by the Lehigh Valley Coal Company, have noticeably improved the appearance of the whole town.

Washington

Spokane—The Western Fuel Association, composed of 500 retail dealers in Washington, Oregon, Idaho, Montana, Utah and Wyoming, will discuss various matters of interest to the trade at its convention in Spokane on Nov. 27.

Seattle—Patent to 150 acres of coal land in Whatcom county was issued by the government land office recently, this patent being the first to go from the local branch in a period extending over almost a year. The land is in the Glacier district and cost $20 an acre.

West Virginia

Charleston—It is reported that the explosion in the Bottom Creek Coal Company's mine, at Vivian, McDowell county, on Saturday last was due to gas, which had accumulated in a temporarily abandoned entry of the mine, the gas being ignited by an engineering crew who were exploring the mine. The men used open lamps, and from the information received at the Department of Mines, the workings, although known to have a little gas, had not shown it in any quantities, and a notice that the particular section had been temporarily abandoned had not been posted by the fireboss, as required under the rules.

Of the 18 men killed, it is believed that the deaths of only four, or eight at the most, were due directly to the gas explosion, which was local. It is thought that the others lost their lives under falling slate. To the fact that there was no explosion from coal dust a great many men who were in the mine at the time owe their lives. The mine was well watered, making a dust explosion practically impossible.

This is the first serious explosion of any kind in this region for a long time, and the first in the Norfolk & Western section for several years. The engineers were sent into the mine by the owners of the land and not by the coal company; all were killed outright. Chief of the Department of Mines John Laing and a number of his deputies are now on the scene, and an effort will be made to fix the responsibility for the explosion.

Huntington—Announcement was made recently of a deal closed by Parkersburg people, with Pittsburg and Philadelphia capitalists, involving the transfer of 3400 acres of coal land on Spruce fork of Little Coal river, in Logan county, the purchase price being $250,000. This coal region has recently been opened up by the extension of the Guyan Valley line of the Chesapeake & Ohio Railroad, and the purchasers will begin development in the territory at once.

Virginia

Bristol—The Dominion Coal Company, with a $150,000 capital, operating mines in Lee county, Virginia, under lease from Black Mountain Coal Lands Company, of Bristol, is now in the hands of a receiver.

Norfolk—It is reported that the general offices of the Chesapeake & Ohio Coal and Coke Company will be moved to Norfolk in the near future.

Canada

British Columbia—Three thousand miners, who have been on strike for more than six months at British Columbia and Alberta coal mines, have returned to work. It is understood that the miners have accepted terms which mean an increase for some men but involve a reduction for contract and pillar work, according to Gordon's findings. The check off is to be handled by the secretary of the union, who must have each man sign for it every month at his option. This virtually means open shop. The agreement is for four years expiring April 1, 1915. It is claimed that the mines will be producing as usual about Dec. 1.

Vancouver—As a result of the October visit to Vancouver island of Andre Lazard, of London, England, manager of the English financial institution known as Lazard Frères, that house has invested $3,000,000 in coal properties on the island's east coast. A large part of the investment will be used for exploration work and for installing haulage power, made possible by hydroelectric plants which utilize the natural water force near the Extension and Cumberland coalfields. This undertaking will occupy the greater part of 1911 and 1912.

PERSONALS

W. H. Loomis has resigned as general manager for the G. B. Markle Coal Company, at Jeddo, Pennsylvania.

O. H. Reinholt, formerly of the Mesabi range, the Philippines and California, reported for duty in the Bureau of Mines, July 14.

H. S. Matthews, former vice-president

and general manager of the Alabama Consolidated Coal and Iron Company, has succeeded Joseph H. Hoadley to the presidency of that company.

Frank H. Crockard, vice-president and general manager of the Tennessee Coal, Iron and Railroad Company, recently escorted a party of Steel Corporation officials over the company's property.

Lowther Ferris has resigned as sales agent of the Carnegie Coal Company in Wisconsin and Minnesota, to take charge of the sales department of the Canadian Collieries Company, with mines on Vancouver island.

T. H. Watkins has been elected president of the reorganized Pennsylvania Coal and Coke Corporation. T. H. Watkins, C. D. Simpson, W. A. Lathrop, Samuel Heilner, Stacey C. Richmond and A. J. Hemphill are directors.

James Bonnyman has resigned as general manager of the Birmingham Coal and Iron Company, effective Jan. 1. This company has been absorbed by the Woodward Iron Company. Mr. Bonnyman will open several small mines near Cardiff, in Jefferson county, Alabama.

James Ashworth, of Vancouver, B. C., has been engaged by the Head Syndicate, Ltd., of London, England, to examine and report on its coal-mining property, situated on the south fork of Old Man river, southwestern Alberta, which property is being developed by the syndicate, with Leslie Hill, of Nelson, B. C., as manager.

Frederick P. Cook, former secretary of the Milwaukee Locomotive Manufacturing Company, has been placed in charge of the New York offices of the company, with headquarters at 111 Broadway. Mr. Cook will handle sales in the States of New York and New Jersey, and will also look after the company's foreign business.

Book Reviews

AMERICAN RED CROSS ABRIDGED TEXT BOOK ON FIRST AID. Industrial Edition, by Major Chas. Lynch and First Lieut. M. J. Shields, 49 illustrations, 175 pp., 16-mo. P. Blakiston's Son & Co., 1012 Walnut street, Philadelphia, 1911.

There can be no better indorsement of the contents of this book than is provided in the names of its authors. It is needless to add here the statement on the title page that the work was "prepared for and indorsed by the American Red Cross."

The introductory chapter describes in simple words with the aid of five diagrams the nature and work of the parts of the human body, leaving out all considerations not pertaining to first aid. Then follows a chapter on the material used in preliminary treatment of the injured. This is followed by others on shock, mechanical injuries, injuries from heat, cold, electricity and poisoning. Carrying the injured and the avoidance of accidents are treated in separate chapters and the book winds up with a suggested method of organizing for first aid and finally a good index which makes it possible to locate the treatment for any ailment without delay. The book has already been published in the Italian, Slavish and Polish languages.

JOHNSON'S FIRST AID MANUAL. Suggestions for First Aid to the Injured in Accidents and Emergencies. Edited by Fred B. Kilpmer. Fourth edition revised, 128 pp., octavo. Johnson & Johnson, New Brunswick, N. J., 1909. Price 50c. cloth bound, 25c. in paper.

There are few books as simple and as practical as this little manual. It has the advantage of being self contained. Does the reader want to know how to stop bleeding of the head? There is a practical page full of illustrations which show just how the work is done and then to make the methods plain in the center of that same page is a head with all the arteries showing. These blood passages are in bright red so that they cannot fail to be distinguished. The charts of circulation are in close companionship with the treatments based on them. There is no necessity to search the volume through to correlate the treatment and the facts on which that treatment is based. The book is well illustrated and practical and well arranged for reference.

Publications Received

Report of Topographic and Geologic Survey Commission of Pennsylvania. 1908-1910, giving the results of two years' work in coöperation with the U. S. Geological Survey. Papers on the present status of natural-gas development and a preliminary list of the fauna of the Allegheny and Conemaugh series in western Pennsylvania are embodied in the report.

"The Resources of Tennessee," for October, containing a preliminary report on the coal resources of the Pikeville special quadrangle of Eastern Tennessee. This is a monthly publication of the State Geological Survey.

"Geology and Mineral Resources of Parts of the Alaska Peninsula," by Wallace W. Atwood, Bulletin 467 of the U. S. Geological Survey.

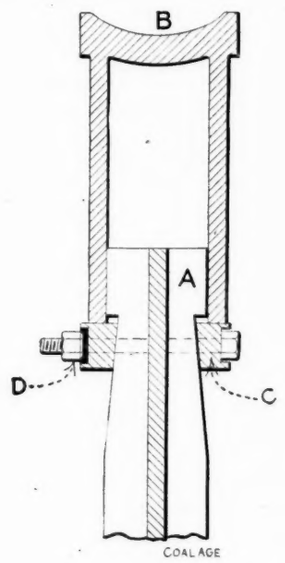
Industrial Item

The General Electric Company reports having sold mining locomotives as follows: One locomotive to Asker Coal Mining Company, for Dorothy, Ky.; one to Ben Franklin Coal Company, for Braeburn, Penn.; one to Inland Steel Company, for Crosby, Minn.; and one gathering locomotive to Davis Colliery Company, for Elkins Colliery Company, Bower, W. Va.

Coal and Coke Patents

UNITED STATES

Prop for mines; August Winz, Rüttenscheid, Germany. No. 1,006,163. As indicated in the drawing, this device consists of an I-shaped support, a head piece and a bolt and nut with two beveled clamps. The support has a head which, projecting up inside the top section, holds it rigidly in a vertical position. Below the head of the I-shaped support the flange faces are slanted and the length of the prop can be altered to a limited extent by adjusting the bolt to hold the clamps at the desired point. Each clamp extends across the two faces of the I-beam on each side and the web of the latter is slotted to permit an up and down adjustment of the bolt.



PROP FOR MINES

Attachment for mining machines; Louis F. Hess, Hawks Nest, W. Va. No. 999,996.

Coal-mining machine; John Sutch and William M. Clark, Somerset, Colo. No. 998,654.

Briquet press; James John Shedlock, Little Bentley, England. No. 1,000,204.

Calorimeter; Gordon Maynard Evans, New York, N. Y., and John Scouller Beckett, Fanwood, N. J., assignors to Fuel Engineering Company, New York, N. Y. No. 1,000,082.

GREAT BRITAIN

Improvements in coal washing, etc.; W. M. Mackey, Leeds, England. No. 763 of 1911.

Improvements in miners' safety lamps; R. Cremer, Leeds, England. No. 8632 of 1911.

Improvements in and means for quenching the coked product of coke ovens, etc.; A. O. Jones, Whitley Bay, England. No. 28,662 of 1910.

COAL TRADE REVIEWS

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

The cold wave, prevailing in all parts of the country, has resulted in a vigorous buying movement, the effects of which have been felt at every producing center. Prices are firmer than at any time this season, and reports of cutting are infrequent.

On the Atlantic coast, gales and generally inclement weather, causing the total loss of one coal freighter, have seriously interfered with coastwise shipments. As a result, water freights are the highest they have been for a number of years and supplies, particularly in some sizes, are short, with orders usually behind.

The Pittsburg mines continue working on about 60 per cent. capacity, although adjacent distributing points report heavy tonnages and demands good. Prices remain at the same level with some cutting, and the coke market shows a slight improvement.

In Ohio and fields to the south supplies are small and the trade brisk. Prices are firm, even advancing in some instances, and consumption heavy. Indications are that more than the usual tonnage is being stored on vessels at eastern Lake ports to be held over; this in anticipation of labor troubles the coming April.

A restricted movement of Eastern coals to the Middle West and an acute car shortage on the Gould and Illinois Central lines have materially strengthened this market. Prices are variously reported as advancing or low but firm. The cold weather has seriously depleted stocks and an unprecedented demand is reported in some districts which railroads and mines are unable to meet.

Mines in the West are working full capacity and a slight fuel shortage in the Northwest appears inevitable as a result of the Crow's Nest strike during the summer. On the Pacific coast cars are becoming scarce with large accumulations on sidings in need of repairs due to the strike on the Harriman lines.

New York

The shortage of marine transportation is being felt here as elsewhere and exists not only in the supply of barges and scows engaged in the Sound business, but is also in the harbor transportation. Many boats engaged in the Sound trade are taking more than twice the usual time for round trips and the slowness of the vessels is interfering with the movement of coal from the New York loading ports, which is causing some accumulations at the piers. Railroad movement, however, does not seem to be as good as it has been and the coal is not accumulating to any serious extent. With the return of favorable weather conditions for marine transportation, the stocks now on hand at the piers will be quickly reduced. Except in one or two instances, there are no consumers along the Sound, reporting shortage on account of delayed transportation. This is probably owing to the fact that most consumers are rather heavily stocked this year.

On account of the slow movement, the market here at New York for the better-grade steam coals, while not strong is fairly firm. For inferior steam coals there is little demand, either spot or contract, and they can only be sold at prices that in most instances do not equal the cost of production. The amount of new business coming into the market is limited and is for the standard grades of steam coal only.

The slack market in the territory tributary to New York is considerably improved from the weak position it has been in this fall. There is a good deal of inquiry for spot shipment but the supply is apparently reduced and as the shipments to the Lakes are discontinued, the supply of this fuel will be further contracted.

There has been no material change in the prices at which tidewater coal has been quoted, for the past two or three weeks.

Boston, Mass.

The heavy storm a week ago and the succession of gales since has made decidedly worse an already complicated situation, and all interests are trying to "find" themselves.

F.o.b. prices on Pocahontas and New River are being firmly held at $2.60, and it is quite likkely, if freights hold up, that there will soon be some new business. Then the operators who have not tied themselves up with long-term delivered-price contracts in the East may reap some reward for their prudence. New England must have coal and the shortage must be made up. Prices on cars at Mystic wharf are said to be up to $3.85, the highest figure for some seasons, and prices at the other points range from 10c. less at Providence to 10c. to 20c. more at Portland and Portsmouth. At retail in Boston an advance to $4.50 per net ton is likely soon to be made.

On the Pennsylvania soft coals there is little change. A large proportion of those loaded at Philadelphia for this market comes in anthracite barges, and the movement of these has been much better than on sail tonnage from the Southern ports. On coals dependent on outside transportation freights are up, and from New York to Long Island Sound points 60c. has been paid this week. Prices for the better grades of Somerset county are still at $1.15@ $1.20 at the mines, only slightly higher than the summer figures.

Buffalo, N. Y.

Soft coal is moving decidedly faster than it did last month, though there is nothing to account for the improvement but the season of the year, as it would be unusual if there was no stir as the cold weather comes on. Some factories are starting up and it is the rule to put in an extra stock against unforeseen contingencies. If prices were going up with the increased consumption there would be no complaint, but they do not show any improvement yet.

The improvement in the soft-coal demand has enabled practically all the Allegheny Valley mines to run full time and if they could secure an advance of even 5c. a ton there would be a different tone to the market. As it is, the competition from districts farther away from Buffalo is such that it is impossible to advance prices.

The near future of the soft-coal trade, especially in the Allegheny valley, is not promising and there is much talk of the day when production will be controlled in some way, so that it cannot exceed the demand. Prices remain nominally unchanged at $2.50 for Pittsburg three-quarter, $2.40 for mine run and $2 for slack, with Allegheny Valley 15 to 25c. less. Coke is still dull at $4.25 for Connellsville foundry and $3.50 for stock coke.

Philadelphia

There has been no change in the situation this week as compared with last in the retail trade. The demand continues unabated for all sizes, with stove and chestnut still leading the van, and reported from all sides as behind on orders. The advance in the price of chestnut seems to have added to its popularity, rather than detracted from it, and it is understood that this holds true in almost every section of the country. Pea

coal is used extensively in this locality for furnaces as well as kitchen ranges, its use as a domestic fuel seeming to increase and, as a result, it will not be long before there will be a shortage in this size.

In the wholesale trade, there is still no let up. From all quarters come hasty inquiries for tidewater as well as rail coal, and to all of these requests there is but one reply, that orders will be filled as promptly as possible. No other guarantee can be given. Outside vessels for the movement of coal are reported to be short, and freights are accordingly inflated. To Southern ports freights are anywhere from 10 to 25c. over quotations earlier in the season, with nothing particular offering at that. Prices remain unchanged.

Pittsburg

Bituminous—Some belated shipments are being made in the Lake trade, but the movement is practically over. Manufacturing demand has been only fair, while the past week saw a material increase in demand for domestic, which has been quite good. The early buying was unusually light, but the cold snap of a week ago brought buyers more freely into the market. Mine operations have been somewhat curtailed, the present average being not much above 60 per cent. of capacity in the Pittsburg district. There continues to be much price cutting by interests which have not much contract business on books. Slack has not yet firmed up any, as it usually does at the close of the lake season. We quote as the average market level: Nut, $1@1.05; mine-run, $1.05@1.10; ¾-in., $1.15@1.20; 1¼-in., $1.25@1.30; slack, 40@50c. per ton at mine, Pittsburg district.

Connellsville Coke—Sales of over 150 cars of prompt furnace coke have been made in the past week, all at $1.50. Several consumers have been buying regularly in the past few weeks, having insufficient coke on their contracts which, of course, are at a higher price than the prompt market, and no more coke is taken on contract than the buyer is obligated for. As a rule negotiations for next year's contracts have not been taken up, but in a few instances buyers and sellers have gotten close together, and news of two or three contracts being closed may come any day. Foundry coke shows no change. We continue to quote: Prompt furnace, $1.50@1.55; contract furnace (nominal), $1.65@1.75; prompt foundry, $1.80@1.90; contract foundry, $2@2.25, per ton at ovens.

The *Courier* reports production in the week ended Nov. 11 at 323,363 tons, an increase of 600 tons, and shipments at 3639 cars to Pittsburg, 4873 cars to points west and 1048 cars to points east, a total of 9560 cars, a decrease of 500 cars.

Cleveland, Ohio

A large amount of coal ordered to the lake front, is still being loaded in boats for storage to be held over at this end of the route. Vessel men are getting 20c. a ton for holding cargoes. There will be a large amount of coal on board at this end, as well as at the upper end of the Lakes. This surplus is prompted largely by the miners' scale coming up next April, and the uncertainty of a strike, in which case this coal will insure a supply, for a time at least.

The domestic trade in the past week has been brisk, owing to the cold snap. There is little improvement in the steam trade, and prices range about the same as a week ago, except in slack, which owing to Lake shipments being shut off, are holding stiff and gradually advancing.

Columbus, Ohio

Real winter weather in the shape of a cold wave was the salvation of the coal trade in Ohio during the past week and improvement has been reported from every mining district in the State. One of the best features of the trade is the better demand for domestic grades and activity is shown in every department of the business. Prices on all grades rule firm to the extreme and complaints of price cutting are not as numerous as several weeks ago.

One of the worst features is the approach of a car shortage which is affecting mines on both the Hocking Valley and Toledo & Ohio Central Railways. The cold snap caused some inconvenience upon that score and in some places deliveries were delayed for several days. Other of the coal roads up to date have been able to move shipments promptly, although the indications are good for a general car shortage in Ohio and contiguous States.

The steam business has also shown some improvement in the past few weeks, although the requisitions of the larger manufacturing concerns are not being increased fast. The reports show that stocks in the hands of the large steam users are small and the cold weather is expected to stimulate that trade as well as the domestic business. Contracts which expire at this time are being renewed at the same figures which prevailed during the past year.

Prices prevailing in Ohio fields are: Domestic lump in the Hocking valley, $1.50; domestic lump in Pomeroy Bend district, $1.60@1.75; ¾-in., $1.35; nut, $1.15; mine-run in eastern Ohio, 95c.@$1.05; mine-run in the Hocking valley, $1.05@1.15; nut, pea and slack, 40@50c.; coarse slack, 35@45 cents.

Cincinnati, Ohio

The car situation is tightening and coal offices are kept on edge for fear orders will be filled in railroad cars objectionable to the purchaser. That should be sufficient evidence that "things are looking up" in the local coal market, which they are. When the operators are tempted to disregard orders and take a chance on sending hopper cars when flat-bottoms are specified in the contract, it is an indication there is no surplus of equipment which means heavy production.

This friction because of equipment ordered and that actually used has arrived about 30 days late, and corresponds well with the lateness of the season. The cold weather, which has continued for almost two weeks now, has relieved the market of a large surplus. In addition, the orders for steam fuels are increasing, and altogether the coal offices are enjoying a good business. The lower grades of fine coals are still to be had at low prices, but this does not apply to the higher grades, which are in fairly good demand and are being held for the price which has ruled in this market for some time—50 to 75c.

Charleston, W. Va.

Unless there is an increase in demand for domestic coal there is likely to be a slump in output in the Kanawha and New River territories by the end of the year. The last shipments for the lakes were scheduled for Wednesday, and unless changed, it will be necessary to cut down in output, providing the increase for domestic, due to the cold weather, does not relieve the situation. Weather conditions are rather favorable, but whether they will be sufficient to make up for the loss in the lake trade is doubtful in the opinion of the coal men.

There has been no general complaint about cars, but with the increase in shipments for domestic trade East some trouble, as usual, is anticipated a little later.

The same usual complex conditions prevail in the Kanawha and New River territories. In some instances conditions are looked upon as being good, while in others there is the usual hard-luck cry with business anything but encouraging. The time cannot be recalled when the conditions were the same from one end of these contiguous territories to the other.

Gas coal from the Kanawha territory is quoted at the mines, mine-run, 85@90c., and lump or screen at $1.25@1.40. In the New River district nearly all coal is run-of-mine, and at the mines brings from 95c.@$1.15.

Nashville, Tenn.

The several days of cold weather last week tended to give the mines in this district all the work they could handle and although at the present time the weather has again turned, the coal business is still in a fairly healthy condition.

Unless something unexpected happens, the price on all grades of fuel in the West Kentucky field seems destined to remain unchanged for the present. This means that price fluctuations will be small during the winter, if any at all.

Quotations on domestic lump in the West Kentucky fields is $1.25 per ton; nut coal, 95c. to $1, and screenings, 25@30c. The demand for steam coal has changed but little, if any.

In the two largest cities in Tennessee, Nashville and Memphis, which use coal principally from the West Kentucky field, the stocks carried by the dealers are quite small. In fact there is hardly a dealer who has over a week's or 10 days' supply in his yards. A spell of weather which would have a tendency to retard the movement of coal will find most of these dealers in a bad fix, and such conditions as this will tend more than anything else to make prices better in this field.

Indianapolis

Indiana coal operators report a spasmodic stimulation in the coal-mining business during the past week, but the recent cold snap was not of sufficient duration to bring the demand up to expectations. They say if the cold weather had continued or even been followed after a few days by another cold snap, increased demand for domestic would have resulted. The domestic trade, however, is not depended on for much by the operators. They say that enough coal can be mined in a comparatively short time to supply the demand for home use for many days. It requires continual and steady work by the large power plants to make the coal-mining business boom.

There are so many factories either closed or working short time that their demand is far below normal at this season of the year. During the first few days of the week some complaint was made because of car shortage.

Chicago

A sharp drop in temperature combined with the continued car shortage has caused a marked upturn of coal prices in the Chicago market. There has been such a restricted movement of Hocking coal that it has been possible for Western coals to sell in competition with Eastern coal at relatively the same price. Hocking Valley at $1.50 brings $3.15 f.o.b. Chicago. Leading operators of the Franklin county field have decided to advance their price to $2 a ton, owing to an unusually brisk demand.

The price of smokeless lump and egg has strengthened materially. The minimum price is $2 and some orders are being placed at $2.25. While the coke trade makes a strong showing in the domestic branches, there has not been very much change in hard cokes or furnace and foundry.

Prices direct from the mines in net tons to retail dealers and steam users on spot shipments are as follows:

	F.o.b. Mines	*Chicago*
Clinton:		
Domestic lump	$2.17@2.37	$1.40@1.60
Steam lump	2.00@2.20	1.25@1.45
Mine-run	1.82@2.02	1.05@1.25
Screenings	1.27@1.37	0.50@0.60
Pocahontas and New River:		
Mine-run	$3.00@3.10	$0.95@1.05
Lump and egg	4.05@4.30	2.00@2.25
Coke:		
Connellsville	$4.50@4.65	
Wise county	4.50@4.65	
Byproduct, egg and stove	4.95	
Byproduct, nut	4.55@4.65	
Gas house	4.85	

Minneapolis—St. Paul

There is a perceptible change in the coal trade all over the Northwestern States, due to the zero weather in mid-November. November 12 and 13 this year made a record for snow and blizzardy winds. While temperature was not extremely low, the high wind made it equal to 20 deg. below zero weather. This sample of cold and snow has continued for a week, and we can now say, "I told you so."

The all-rail shippers now have trouble in pacifying their customers even with every mine running to full capacity. Prices on Southern Illinois lump and egg are now held at $2 per ton at the mine, and other grades of Illinois in relative proportion. It is not thought likely that prices will go beyond this, but customers who stored coal during summer will be taken care of during the stress.

A similar condition exists at head of the Lake docks. The orders have come so thick and fast, it has been beyond both the dock companies and the railroads to keep up with the demand. Cars are difficult to obtain on the Great Northern and Milwaukee roads, especially for shipment off their lines.

St. Louis, Mo.

There has been a slight change in the local market, but it is spasmodic—up one day and down the next, depending largely upon the car supply. Conditions improved the early part of the week on practically all coals, although the advance on Standard was slight.

The local domestic trade is just fairly good—and as usual one or two large dealers who have the output of mines at a low figure are keeping the retail price down to a point where it is a losing proposition to the average operator. This applies both to the high-grade and Standard coals.

The car shortage is so severe on the Gould lines that the mines are only working from one to two days per week. On the Illinois Central it is such that the mines do not get over two to three days a week, and on the 'Frisco lines the mines are working about four days, while in the Standard field about four and a half days is the average. There is very little coal coming in from the Springfield district and the Saline and Gallatin Counties field.

The prevailing prices are:

Carterville	
6-in. lump	$1.50@1.65
3-in. egg	1.50@1.60
No. 1 nut	1.20@1.30
No. 2 nut	1.10@1.20
No. 3 nut	0.90@1.00
2-in. screenings	0.55@0.65
Mine-run	1.00@1.15
Franklin Co.	
6-in. lump	$1.65@1.75
3-in. egg	1.65@1.75
No. 1 nut	1.60@1.70
No. 2 nut	1.40@1.50
No. 3 nut	1.15@1.25
Jackson Co. (Big Muddy)	
6-in. lump	$2.25
2-in. lump	2.00
Du Quoin	
6-in. lump	$1.30@1.40
3-in. egg	1.25@1.35
No. 1 nut	1.10@1.15
Standard	
6-in. lump	$1.10@1.20
2-in. lump	1.00@1.10
2-in. screenings	0.25@0.35
No. 1 nut	0.70@0.80
No. 2 nut	0.60@0.70
Anthracite	
Chestnut	$7.20
Stove and egg	6.95
Grate	6.70
Smokeless	
Lump	$4.50@5.00
Coke, gashouse	4.65
Byproduct	5.00

Spokane, Wash.

Dealers in Spokane report no change in the local situation nor in other parts of the inland empire. The supply on hand is sufficient for domestic and factory purposes, though it is thought it will possibly be 60 days before the mines in the Crow's Nest country resume shipping extensively to this territory.

Prices are reported to be from 25c to 50c. lower this year than at the same time in 1910. Best domestic lump and nut, $8.25 to $9; anthracite, Pennsylvania, $17.50; steam coal, $6.25.

San Francisco

The arrivals of coal are not keeping pace with the consumption. Since our last report but 5831 tons have arrived from Australia and 697 tons from Seattle.

The last cargo from British Columbia arrived on Nov. 2 and another is not due from there until Nov. 20; nor can more than 3500 tons arrive from Australia before December.

Stocks held by wholesalers are quite adequate to present demands, but should the State be visited by a few weeks of cold rains, and heavy snowfall in the mountains, which would be seasonable, the consequent delays to rail shipments would reduce supplies to the danger point.

The car shortage still continues. A large accumulation of cars needing repairs is noticeable at all railroad division points. Dealers in the interior are compelled to wait several days beyond the customary time before their orders can be filled.

All prices remain the same with the exception of the Utah Fuel Company's local-yard prices, which advanced on Nov. 11 to $8.50 per short ton. Anthracite briquets have been reduced from $10 to $8.50 per short ton.

Portland, Ore.

Portland has had its first cold spell this winter. It came without notice and disappeared about as suddenly. Its duration was about a week and during that time the lowest temperature was 31 deg. above. Naturally the cold wave made quite an inroad on the fuel stored away for the season and it inspired many to replenish the supply, fearing that another cold wave may leave them short at the wrong time.

Following are the prices asked here per ton, including cost of delivery to points within the city proper:

Japanese	$7.50	
Washington lignite	$7.00@ 7.50	
Australian	10.00@10.50	
Rock Springs, Wyo.	10.00@10.50	nut $9.50
Diamond, Wyo.	10.00	
Carbon Hill, Wash., lump	10.50	
Carbon Hill, steam	7.50	
Newcastle, Wash.	7.00	
Beaver Hill, Ore.	9.00@ 9.25	
Blacksmith coal	17.00	

Production and Transportation Statistics

Kanawha Record Association

The following is a summary of shipments according to the report of the Kanawha Record Association for the fiscal year ending Aug. 31, 1911:

	Tons Coke	Tons Coal
Kanawha district	48,450	8,590,025
Kentucky district	13,020	1,247,900
New River district	198,420	6,224,900
Total	259,890	16,062,825

Railroad, Rivers and Canals

Statement of coal and coke over various railroads, rivers and canals, September and nine months ended September, 1910-1911, in short tons:

Railroads	September 1910	September 1911	Nine Months 1910	Nine Months 1911
Baltimore & Ohio[1]	3,251,239	3,194,579	27,298,982	25,385,086
Buffalo, Rochester & Pittsburg[2]	713,171	718,062	5,917,364	5,997,738
Buffalo & Susquehanna[2]	150,761	155,627	1,246,057	1,429,985
Chesapeake & Ohio[1 2]	1,409,472	1,610,537	10,783,007	10,452,464
Huntingdon & Broadtop Mountain[1 3]	117,313	110,815	940,772	815,400
New York Central & Hudson River[3]	603,574	649,915	5,768,971	5,918,423
Norfolk & Western[1 3]	1,678,194	1,933,132	14,939,635	15,113,959
Pennsylvania (east of Pittsburg and Erie)[1 4]	5,263,383	5,387,090	48,552,283	46,874,400
Pittsburg & Lake Erie[3]	1,619,639	1,561,644	13,220,065	11,897,848
Pittsburg, Shawmut & Northern	111,315	122,713	876,931	1,054,039
Southern Railway[2]	370,237	351,685	2,820,551	2,474,885
Virginian Railway[3]	195,122	271,756	1,065,362	1,975,659
Western Maryland Railway	243,783	222,942	2,456,782	1,963,660
Rivers and Canals				
Chesapeake & Ohio Canal	19,393	21,411	129,250	126,586
Davis Island Dam	36,770	157,955	1,542,915	2,227,740
Great Kanawha River	101,280	147,920	980,120	942,400
Monongahela River	753,570	610,345	7,319,260	6,759,592

[1] Includes coal received from connecting lines.
[2] July and seventh months' figures.
[3] Includes company's coal.
[4] Does not include company coal hauled free.

Ohio Coal Traffic Statement

Statement of bituminous coal mined in Ohio and shipped over railroads specified, September and first nine months, 1910 and 1911, in short tons:

Railroads	September 1910	September 1911	First Nine Months 1910	First Nine Months 1911
Hocking Valley	468,449	367,949	3,367,089	2,517,884
Toledo & Ohio Central	204,506	206,606	1,564,869	1,335,270
Baltimore & Ohio	255,130	154,780	1,783,233	1,259,002
Wheeling & Lake Erie	331,264	399,809	2,771,902	2,556,251
Cleveland, Lorain & Wheeling	218,661	306,407	2,311,963	2,166,127
Zanesville & Western	87,268	126,173	878,291	802,169
Toledo, Division Pennsylvania Co	199,530	156,202	1,664,120	1,379,682
Lake Erie, Alliance & Wheeling	131,645	117,610	902,946	891,973
Marietta, Columbus & Cleveland Railway	7,992	2,236	75,474	20,844
Wabash Pittsburg Terminal Railway	6,267	4,919	45,723	48,470
Kanawha & Michigan Railway	.....	16,348	.....	72,697
Total	1,910,712	1,859,039	15,365,610	13,050,369

Chesapeake & Ohio Railway

The following is a comparative statement of the coal and coke traffic over the Chesapeake & Ohio railroad for the months of August, 1910 and 1911:

COAL

To	1911	Per Cent.	1910	Per Cent.
Tidewater	338,195	21	373,217	27
East	164,761	10	141,868	10
West	1,062,805	67	851,644	61
Total	1,565,761		1,367,429	
Bituminous from connections	21,930	1	6,663	1
Anthracite from connections	3,288	1	1,178	1
Grand total	1,590,979	100	1,375,270	100

COKE

Tidewater	330	2	4,729	14
East	10,520	54	18,771	55
West	6,002	31	8,021	23
Total	16,852		31,521	
From connections	2,706	13	2,681	8
Grand total	19,558	100	34,202	100

The Baltimore & Ohio Railroad Company

Statement of bituminous coal and coke shipments for the month of September:

	1910 Tons	1911 Tons
Coal	2,650,172	2,614,201
Coke	372,988	341,350
Total	3,023,160	2,955,551

Norfolk & Western Railroad

Coke shipments, originating entirely in the Pocahontas field, were 91,619 tons.

Production according to districts at mines on the Norfolk & Western Railroad in West Virginia for the month of October, 1911, were as follows in short tons:

	Coal
Pocahontas	1,185,594
Tug River	194,028
Thacker	206,302
Kenova	78,998
Total	1,664,922

Anthracite

The following are the monthly shipments of anthracite coal, 1910-1911:

Months	1910	1911
January	5,306,618	5,904,117
February	5,031,784	5,070,948
March	5,174,166	5,996,894
April	6,224,396	5,804,915
May	5,679,601	6,317,352
June	5,398,123	6,215,357
July	4,202,059	4,804,065
August	4,996,044	5,531,796
September	4,967,516	5,730,935
Total	46,980,307	51,376,379

Foreign Markets

Great Britain

Tonnage is still being delayed by heavy weather, and the market is quiet for prompt loading. For forward delivery prices are firm, with an improving tendency. Quotations are approximately as follows:

Best Welsh steam coal	$4.08
Seconds	3.90
Thirds	3.63
Best dry coals	3.96
Best Monmouthshire	3.66@ 3.69
Seconds	3.48
Best Cardiff small steam coal	1.92@ 1.98
Seconds	1.80@ 1.86

The above prices for Cardiff coals are all f.o.b. Cardiff, Penarth, or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both exclusive of wharfage and for cash in 30 days, less 2½ per cent discount.

Belgium

Coal production in Belgium for the first half of the present year, ended June 30, was 11,546,970 metric tons. For the same period last year the production was 11,828,990 metric tons.